THE MARINE REVIEW

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THE GROWTH OF BRITISH SHIPPING.

The board of trade has just issued a series of tables showing the progress of merchant shipping in the United Kingdom and the principal maritime countries. The first of these shows the tonnage of sailing and steam vessels of different nationalties entered and cleared in the foreign trade at the ports of this country for a series of years; and the figures demonstrate (1) the enormous growth of British trade, (2) a slight but gradual increase in the competition of foreign shipping, and (3) the practical disappearance of the sailing ship.

Beginning with the year 1860 the total tonnage, sailing and steam, with cargoes and in ballast, entered and cleared was 24,689,292. Ten years later this total had been increased by 12,000,000 tons, but in the seventies the growth was in much greater proportion, and in 1880 the figures stood at 58,736.063 tons. In 1890 it had increased by fifteen and a half million tons, and in 1900 by a further 24¼ million tons; while last year it reached the enormous total of 120,790,310 tons. British ships have always carried the greater part of this trade, but the percentage has varied at different times. In 1860 the British tonnage was 56.4 per cent of the total, in 1870 68.4, in 1880 70.4, and in 1890 72.7. High-water mark was reached in 1895, when the proportion was 72.9 per cent. In 1900 it fell to 63.7, but in 1901 it rose to 64.4, in 1902 to 64.9, and in 1903 to 65.5. It fell again in 1904 to 64.2, and in the two succeeding years it stood at 63.3 per cent. If we take steam tonnage alone, the percentage is slightly higher, but, on the other hand, it has fallen at a more rapid rate. For example, in 1870, when only about 40 per cent of the tonnage entered and cleared was steam, 88½ per ecnt, of that steam tonnage was British. In 1880 the proportion fell to 83.2 per cent, in 1890 to 79.5, in 1900 to 66.8, and in 1906 to 65.1. This reduction is due mainly to the abnormal growth in the shipping of Germany, Norway, Holland, and Denmark. British tonnage entered and cleared at British ports has grown steadily. In 1860 it was 13,914,923, of which 4,186,620 was steam; and in 1906 it was 76,465,979, of which 75,347,224 was steam. In 1860 the foreign tonnage entering and clearing at British ports was 10,774,369, of which 780,853 tons was steam; and in 1906 it was 44,324,331, of which 40,374,078 was steam.

In 1860 nearly 80 per cent of the total tonnage and 70 per cent of the British tonnage entered and cleared was represented by sailing ships. In 1870 the steam tonnage had grown to 41 per cent of the total, and 53 per cent of the British tonnage; in 1880 to 63 per cent of the total, and 75 per cent of the British; in 1890 to 83 per cent of the total, and 90 per cent of the British; and in 1900 to 91 per cent of the total, and 96 per cent of the British. Last year the ships entered and cleared at British ports represented 120,790,310 tons, of which 115,721,302 was steam tonnage, and of 76,465,979 tons of British shipping entered and cleared only 1,118,755 tons represented sailing ships. Forty-six years ago sailing ships represented a tonnage of 20,000,000, or four-fifths of the total entrances and clearances; today they represent a tonnage of 5,000,000, or 1/24 of the total. British sailing ships in 1860 represented a tonnage entered and cleared of 9,750,000 out of a total of 14,000,000 tons; today they represent but 1½ per cent of the total. The tables show a four-fold growth in the tonnage of foreign vessels entered and cleared in ports of the United Kingdom. German tonnage has increased from 2,314,255 in 1860 and 1,763,433 in 1870 to over 9,000,000 in 1906; Norwegian from 1,456,764 in 1860 to 7,504,637; Danish from 750,000 to 4,700,000; Dutch from 500,000 to 4,000,000, and Russian from 250,000 to 5,000,000 tons. On the other hand, American tonnage in 1860 was 2,981,697, and was entirely in sailing ships. In the succeeding 30 years this shipping trade almost entirely disappeared. and in 1890 the American tonnage entered and cleared was only 291,933. Since then the entrances and clearances of American steam tonnage has grown steadily, until last year it reached 1,240,177.

The tonnage of the merchant navies of different countries is given as follows:

United Kingdom	11,167,332
British Possessions	1,624,049
Russia	1,083,000
Norway	1,392,593
Sweden	744,307
Denmark	517,201
Germany	2,515,815
Holland	462,465
France	1,214,505
Spain	722,517
Italy	922,182
United States (for oversea trade)	939,486
Japan	1,394,745

The North German Lloyd liner Kaiser Wilhelm der Grosse, which lost her rudder off the Newfoundland banks last month, has been found to be more seriously damaged than was at first believed, and she will be taken out of the service for a period of five months, during which she will undergo repairs.

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SUMMARY OF NAVAL CONSTRUCTION.

The summary of naval construction issued by the navy department shows the customary rate of progress upon naval vessels as follows:

NAME OF VESSEL.	BUILDING AT—	—1907— —Per cent of completion.— Oct. 1.	Nov. 1.
BATTLESHIPS.			
Mississippi	Wm. Cramp & Sons	94.96	96.82
Idaho	Wm. Cramp & Sons	87.54	89.41
New Hampshire	New York S. B. Co.	85.30	90.20
South Carolina	Wm. Cramp & Sons	24.66	28.83
Michigan	New York S. B. Co.	25.70	29.10
Delaware	Newport News S. B. Co.	00.65	2.33
North Dakota	Fore River S. B. Co.	00.00	4.23
ARMORED CRUISERS.			
North Carolina	Newport News S. B. Co.	91.50	93.33
Montana	Newport News S. B. Co.	84.62	87.38
SCOUT CRUISERS.			
Chester	Bath Iron Works	90.64	92.70
Birmingham	Fore River S. B. Co.	89.46	90.79
Salem	Fore River S. B. Co.	86.99	88.52
TORPEDO BOAT DESTROYERS.			
T. B. Destroyer No. 17	Wm. Cramp & Sons	00.00	00.00
T. B. Destroyer No. 18	Wm. Cramp & Sons	00.00	00.00
T. B. Destroyer No. 19	New York S. B. Co.	00.00	00.00
T. B. Destroyer No. 20	Bath Iron Works	00.00	00.00
T. B. Destroyer No. 21	Bath Iron Works	00.00	00.00
SUBMARINE TORPEDO BOATS.			
Submarine T. B. No. 9	Fore River S. B. Co.	99.00	99.00
Submarine T. B. No. 10	Fore River S. B. Co.	99.00	*
Submarine T. B. No. 11	Fore River S. B. Co.	99.00	*
Submarine T. B. No. 12	Fore River S. B. Co.	99.00	99.00
COLLIERS.			
Vestal	Navy Yard, New York	49.00	52.70
Prometheus	Navy Yard, Mare Island	00.70	6.60
TUG BOATS.			
Patapsco	Navy Yard, Portsmouth	28.00	28.00
Patuxent	Navy Yard, Norfolk	25.00	27.00

*Delivered at Naval Torpedo Station, Newport, R. I., Oct. 16, 1907.

PLANS FOR NAVAL REVIEW.

That the review by President Roosevelt of the 16 battleships of the Atlantic fleet, which is to take place prior to their sailing for the Pacific, will be the greatest ever witnessed in American waters is the opinion of naval officers, and great enthusiasm is being displayed among both the officers and men of the vessels partaking over the preparations for the great pageant.

The fleet that passed in review before President Roosevelt on Sept. 3, 1906, at Oyster Bay numbered more vessels than will be reviewed on Dec. 16, but it was a vastly inferior fleet in displacement and armament compared to the magnificent line of modern vessels which the public will have a chance to see assembled in Atlantic waters for the last time in several years, perhaps, a few weeks hence. In the fleet of 1906 there were 12 battleships in line, and of this dozen two were vessels that since have been put in reserve—that is, practically retired from the fighting line. These ships were the Indiana and Iowa.

In the review next month, the ships that will be present and which were not seen in Oyster Bay in September, 1906, are the Connecticut, Georgia, Kansas, Vermont, Ohio, and the Minnesota. In addition to the battleships, there also will be in the review every one of the auxiliaries that will accompany Admiral Evans to the Pacific.

As figured out by one of the officers of the flagship Connecticut, the following in all probability, will be the order in which the ships will pass in review on Dec. 16:

FIRST SQUADRON.
First Division.
Connecticut, flagship of Rear Admiral Robley D. Evans, Commander-in-Chief of the Atlantic Fleet.
Louisiana.
Kansas.
Vermont.

Second Division.
Rear Admiral William H. Emory, commanding. Georgia, flagship of Rear Admiral Emory.
Virginia.
New Jersey.
Rhode Island.

SECOND SQUADRON.
Third Division.
Rear Admiral Charles M. Thomas, commanding. Minnesota, flagship of Rear Admiral Thomas.
Ohio.
Maine.
Missouri.

Fourth Division.
Rear Admiral C. S. Sperry, commanding. Alabama, flagship of Rear Admiral Sperry.
Illinois.
Kearsarge.
Kentucky.

Fleet Auxiliaries.
Celtic, supply ship.
Culgoa, supply ship.
Panther, repair ship.
Arethusa, tender.
Yankton, tender.
Hannibal, collier.
Leonidas, collier.
Marcellus, collier.
Brutus, collier.
Ajax, collier.
Abarenda, collier.
Caesar, collier.
Nero, collier.

President Roosevelt, of course, will review the fleet from the bridge of the naval yacht Mayflower. Immediately preceding or following the review, the president, it is understood, will visit in turn each of the four flagships of the fleet. On the bridge of the Mayflower with the president probably will be the secretary and assistant secretary of the navy, Admiral Dewey, the president of the general board; Rear Admiral Brownson, the chief of the bureau of navigation, and probably several of the flag officers who are at the head of bureaus in the navy department at Washington.

NAVIGATION AND NAUTICAL LECTURES.

During the academic year 1907-08 Columbia University, New York, in co-operation with officers of the United States navy and the United States coast and geodetic survey, offers a series of public lectures in navigation and nautical science. They are intended for yachtsmen, officers of merchant vessels in New York harbor, and all persons interested in the safe navigation of the seas. The lectures will be given in 309 Havemeyer on Tuesday afternoons at 4:30 on the dates following, and will be illustrated:

Nov. 12, introductory address, Rear Admiral C. F. Goodrich, U. S. N.; "Dead Reckoning and Coastwise Navigation," Lieut. Com. W. S. Crosley, U. S. N.; Nov. 19, "The Bottom of the Sea and Its Uses in Navigation: Latitude," Lieut. Com. R. H. Leigh, U. S. N.

Dec. 3, "Deep Sea Navigation: Longitude," Lieut. Com. R. H. Leigh, U. S. N.; Dec. 10, "The Sun and Its Motions," Prof. Poor; Dec. 17, "The Making of an Almanac," Prof. Poor.

Jan. 14, "Tides: Their Characteristics, Observation and Prediction," Dr. R. A. Harris; Jan. 21, "The Causes and Representation of the Tides," Dr. R. A. Harris; Jan. 28, "Tidal Currents and Meteorological Tides," Dr. R. A. Harris.

Feb. 14, "How Charts Are Made and Used," lecturer to be announced; Feb. 11, "The Magnetic Survey of the Pacific Ocean by the Carnegie Institution," Dr. L. A. Bauer; Feb. 18, "Finding the North Magnetic Pole," Prof. Hallock; Feb. 25, "The History

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of the Compass and Its Errors," Capt. Howard Patterson.

The lectures are open to the public. No tickets of admission are required, but the doors will be closed promptly at 4:30 p. m. Syllabi will be prepared and may be had upon application to the secretary of the university.

IN THE MATRIX.

BY JAMES ROSSAN.

The engineer of the Magnolia walked through the machine shop surveying the busy scene. As his glance wandered over the various workmen at their machines or benches there lurked something in it akin to contempt. Presently he encountered the foreman, and in his blunt, abrupt, way he threw his wants at him.

"I want an oiler."

"Yes, sir, Mr. Currie," the foreman answered in his smooth way, acquired through years of efforts to please customers. "I think we have just the fellow who will suit you, only the other day he spoke of wanting an opportunity to go to sea."

"Same old story, I suppose," Currie interrupted, "looking for a chance to see the country at good wages with nothing to do?"

"No, Mr. Currie, I hardly think that is the case this time," the foreman replied meekly, bearing in mind sundry experiences of the past.

"Has he served his time?" was the engineer's next query.

"Yes, sir, and two years as a journeyman besides."

"And that makes it all the worse," Currie kept on in his skeptical way.

"How is that?"

"Too much to unlearn. But, never mind, I'll give him a show and if it is in him it will just naturally work out itself."

The man in question was a clean-cut young fellow who had come into the shop early in life to serve his apprenticeship. He had shown an aptness for the work. He was precise in his calculations, and became a rapid and skillful workman. So he naturally drifted into the more responsible jobs of the shop. It was he who was sent aboard of the boats to replace a broken crankpin, or, perhaps, to line up an old scrapheap with a hankering to run on an inclined plane. It was he who was sent to the dry dock to key on propellers or take out bent tailshafts. And thus he came to be counted a first class machinist.

Now there comes a time in the life of most young men when they feel the call of the sea. The free, roving, adventurous life draws like a magnet, and Finlay Moran was no exception to the rule. Of course, the engine room was his natural bent.

The United States government is very particular about the men employed as marine engineers, and makes very sure that they have the proper amount of practical experience gained only in the engine rooms of the boats. Had it not been for this fact he would probably have considered himself a full-fledged engineer, as he told Currie he had a fair knowledge of thermodynamics and also of the practical running of machinery ashore. Yet the route of the oiler was the only way open to fame. So he was regularly shipped on the Magnolia, and Currie was the man who was to take him through his paces.

There was an air of importance about him as he stepped aboard the ship and surveyed the big engines of which he was to become the mentor. The responsibility lay heavy on him, and he figured that his vast knowledge of mechanics would stand him in good stead now, as well as the many handsome tools he brought, such as calipers, micrometers, protractors and many others used in fancy calculations.

The Magnolia was one of the old-style wooden boats, but her machinery was comparatively modern and powerful; in fact, that was the Magnolia's trouble, too much for the old weakened hull.

The skipper was an ambitious man, in loading the boat he had overstepped the limit. Consequently she had not proceeded far on her voyage before she stuck on a mudbank in the draw of a bridge. This blocked navigation and there was the dickens to pay. The services of a couple of tugs were enlisted, but to no avail.

Currie was an ambitious man too, he overstepped the limit in the amount of power produced, and very promptly the horsepower crankpin brasses went up in smoke. Although things were blue in the engine room, the new oiler almost exulted in the occurrence. This was in his line, there would be repair work now, and he would show them what he was good for.

The connection was hurriedly taken down, and it was found that the brasses had sprung and clamped solid on the pin; this made it evident that they would have to be cleared out. Finlay had already made a mental calculation of how he would do the job. He had repaired many like it, and would fall into the work perfectly natural. He would smooth the pin, first with a fine file and later with a whetstone, then he would take the brasses to the shop and bore them a trifle larger than the pin, thus giving them the proper amount of clearance.

Hardly had he finished his calculation on the proper size to bore them when the skipper came to the engine room and announced in tones not to be mistaken that he wanted those engines, and wanted them p. d. q. And Currie answered him, that they would be at his services in 30 minutes.

The oiler nearly threw an apoplectic fit upon hearing this. Of course, all idea of the shop was knocked into a cocked hat, and he asked wonderingly:

"Shall I start scraping them, sir?"

"Scrape your grandmother!" was the answer.

"Ah, I see," he continued, somewhat taken aback. "You intend to file them, that is quicker but it leaves them pretty rough."

"File hell!" came the blunt answer again. "Get a hammer and cold chisel and chip it off in a hurry." The obnoxious metal was cut away, and, to the consternation of the oiler, only the rough edges were smoothed over with the file. The connection was then hastily assembled and inside of thirty minutes the engines were churning away full speed ahead. In due time the ship wiggled over the mudbank and slid out into the deep, clear water beyond. And the new oiler had learned lesson number one.

It did not take Currie long to break the new man in to caring for the machinery, and out in the lake all things ran smoothly. Then, one morning, the "second" came to the engine room. He was another blunt, abrupt son of Vulcan. He faced the oiler and said:

"Say, who do you suppose is going to keep this boat clean? The ceiling is smoky, the walls are spotted and the floors are greasy. Now I'll show you how to do it, and then you get busy!"

He was now shown how to utilize the few spare minutes, when the engines did not require his attention, in cleaning up. Perhaps it was a quick dash over a section of the wall with a scrubbing brush and sponge, perhaps it was a rub with pomade and whitening on a soiled piece of brass; the idea was to do it quick and thorough. That "second" was an expert at it, he had been through the mill himself. This quite dispelled any illusion the oiler had nourished about steamboating being a soft snap. Men-

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tally he began drawing comparisons of standing at the lathe clad in a neat suit of overalls and a frantic chasing around among flying machinery in a grease-covered suit, with an occasional dive into the bilges or a spasmodic scrubbing-bee for variation. Yet, in spite of it all, he liked the work. There was the satisfaction of viewing the finished product as represented by the speed of the boat. And I am happy to say that in time he assimilated lesson number two; and no boat arrived in port with engine room cleaner and slicker than the Magnolia.

It happened a few trips later that they had a couple of days at the dock. The work had been piling up and now was the opportunity to catch up. All day they worked at the various jobs. Unlike in the shop evening brought no respite. Along toward morning it required considerable of an effort on Finlay's part to keep awake. In a dexterous way he managed to convey the idea to the "chief" that a little sleep would be welcome.

"Sleep!" that dignitary broke him off with. "Did you come aboard of this boat to work or to sleep? Now remember, we work when there is work to do and sleep when there is none!"

The oiler conjured up a sad comparison between his snug bed at home and night work on a steamboat, but gradually the fact dawned on him that boats must be kept going at all hazard, and this was lesson number three.

He learned other lessons too numerous to mention. Then came the heat of summer and with it its attendant trouble in the stokehold. On this particular trip a couple of booze-fighters were shipped and ere the voyage was half completed distress signals in the shape of cramps were in evidence.

During the entire watch Currie had been busy repairing a broken windlass forward. Upon his arrival in the engine room he noticed the sooty marks of the stokehold on the oiler. His inquiry after the stoker brought the following answer:

"Yes, he's knocked out altogether, so I took her. The other fellow is gone, too, but I'll take her after dinner."

And he did take her after dinner. And he held her several watches after that without murmur or palaver. Currie was almost dumbfounded. It ran against the grain to see a man working like that, but previous experiences with getting men to man the stokehold in emergencies made him keep his peace.

At the end of the voyage he slapped the oiler good-naturedly on the back and said:

"What made you do it, my lad?"

"Well, you see," he answered, "I came on this boat to work. With both of them gone, I figured it was up to me."

"Was that all?" said Currie, looking him steadily in the eye.

"No, sir, not exactly," he admitted. "Of course, I was perfectly sure of the engine room, but I had my doubts about being able to handle them in the stokehold. Now I know. And, man, look at the experience I have had."

Currie never answered a word, but later in the day, as he walked into the shop and the foreman greeted him with the customary: "Well, how's the oiler?" he answered him in tones which portrayed the depth of his convictions:

"That boy's alright. You can bet your whiskers that he will be coming into port on them for a long time to come. Not as oiler though, but as chief engineer of them, and the best of them at that."

"Well, did'nt I tell you that he was a first class workman?" the foreman put in.

"Yes, but it is'nt exactly that," Currie replied.

"And also that he was a good, decent, clean-cut fellow," the foreman continued.

"And it's not just that, either," Currie persisted.

"Well, then, what in the world is it?"

"Mark my words," Currie answered, looking the foreman straight in the eye. "You could drop him from a balloon into a derelict and he would do something with her, start her for the harbor some way, even if he had to bale her out with his hat, steam her up with the bulwarks and drive her in with a deckwinch. You see, he has the qualification which goes to make up a marine engineer."

"And that is?" came in an awed whisper from the foreman.

"Adaptability."

The United States Transportation Co., generally known as the Neptune line, recently acquired control of the Joy Steamship Co. and has entered into the operation of its fleet. The latter company operated its steamships from New York to Boston and Providence.

TURBINE V. RECIPROCATING ENGINES IN ATLANTIC LINERS.

The German critic says that reciprocating engines, when worked at lower powers, have a "comparatively exceedingly high" reduction in coal consumption, giving high radius of action, and that such is not the case with the turbine steamers. It is true that experience has shown that at low powers turbines are not quite so economical as reciprocating engines; but it must not be forgotten that in the Atlantic service the periods of reduced speed are rare, and are even then of short duration. The practice rather is to drive the ship at full power, under which condition there is no reason why the turbine should not be as economical as reciprocating engines, if not more so. We cannot, however, understand why Dr. Wiegand should continue: "When the speed of a turbine is reduced, the coal consumption remains practically the same; its efficiency, however, sinks down to a minimum. Should a turbine steamer encounter head winds and heavy seas, it can easily happen that for a largely increased passage time she will not have sufficient coal on board, while the steamer driven by reciprocating engines can always help herself by an important reduction in her speed." This, if accepted, is certain to create an absolutely wrong impression. Experiments show that for a range of power from full down to quarter power, the volume of steam entering a turbine is nearly constant. Since, however, the torque varies more or less proportionately to the initial pressure, the weight of steam passed through the turbine diminishes as the power is reduced, and in actual marine practice the total consumption at quarter power is less than half that at full load. So that Dr. Wiegand's statement is far from representing the actual facts of the case. Again, Dr. Wiegand surely understands that the rate of coal consumption per unit of power per hour —which alone is affected by the comparative efficiency of the turbine and reciprocating engines at low powers— does not greatly affect the aggregate coal consumption per nautical mile run at low powers; consequently, the Lusitania at 20 knots may steam the same distance for an equal, or, at least, only a slightly greater, amount of coal than a ship with reciprocating engines proceeding at a corresponding reduction of her full speed. The deduction made by Dr. Wiegand therefore falls. He further contends that

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the loss in traveling speed due to heavy weather may be greater in the case of turbine steamers. owing to the small dimensions of the propellers. This is one of the difficult problems in connection with turbine propulsion. Dr. Wiegand points out that experience shows that the maximum propelling power of screws lies somewhat near 80 revolutions, and that in the Lusitania it is impossible, without loss of power, to go below 180 revolutions. These are bold statements, especially in view of the extremely cautious words by scientists who have made the propeller problem one of close investigation. One of the illuminating remarks made by Dr. Wiegand is that the propeller problem does not form a decisive objection, for it would probably be removed by gradual improvement. If improvement is possible in this respect, surely advance may be made also in connection with coal-consumption question, even admitting that at reduced speed on the Atlantic the turbine machinery is not economical. We believe that, so far, there is no marked inclination at the present time on the part of the German shipping companies to make what they regard as a costly experiment in building a ship to compete with the Lusitania and Mauretania, but we should welcome an attempt on the part of such an experienced firm as the Vulcan Co. to construct a ship with reciprocating engines to maintain an average speed of 24½ or 25 knots on the Atlantic. —*Engineering.*

AROUND THE GREAT LAKES.

The steamer Wallula of the Gilchrist Transportation Co.'s fleet has gone into winter quarters at Milwaukee.

Andrew Blackman, a sailor on the schooner Belle, was drowned in the harbor at Grand Haven on Monday. He was 18 years old.

Capt. Peter C. Smith, a well known vesselman, is suffering from a paralytic stroke at his home in Bay City, and is not expected to recover.

The steamer D. R. Hanna, while loading coal at Huron last Thursday, backed into the dock and disabled her rudder. It was necessary to make repairs before the steamer left port.

The steamer Leland S. DeGraef, bound down with ore, ran hard aground at Bar Point last Thursday and had to lighter considerable of her cargo before she could be released.

The new steamer Thomas Barlum, building at the Wyandotte yard of the American Ship Building Co., was launched at noon on Thursday of this week, and was christened by Mrs. John J. Barlum.

Wm. J. Murphy, of Manitowoc, Thomas Heffron, of Ashtabula, and Christian Johnson, of Cleveland, have been elected delegates to the International Seamen's convention to be held at Chicago next month.

The steamer Ramapo of the Union Steamboat line, which lost her rudder and propeller in Lake Michigan last week, will be out of commission for the balance of the season. The loss is estimated at $2,500.

The steamers Lycoming and Schoolcraft and the barges Bourke, Sweetheart, Nester and Unadilla, went into winter quarters at Tonawanda on Monday, making sixteen vessels tied up at that point up to the present time.

The steamer Frank Peavey, which was driven ashore at Buffalo in the storm on Wednesday of last week, was released on Thursday, in spite of the continued heavy weather. She is not seriously damaged.

Capt. James Reid, of the Reid Wrecking Co, has announced that he will float the wrecked steamer Spokane on Gull rock, Lake Superior. Although the Spokane is in very bad shape, he is confident that he can release her and work will be begun at once.

The little tug Myrtie, which ran on the rocks in the Niagara river recently, was pounded to pieces in the heavy weather last week and is a total loss. She was valued at $4,000, and was engaged in towing scows used in the construction of the Black Rock ship canal.

Col. G. J. Lydecker, government engineer in charge of the central division, embracing the great lakes and other territory, retired last Friday on the age limit. Col. Charles E. L. B. Davis, district engineer, has been temporarily appointed to succeed Colonel Lydecker.

The steamer Orinoco of the Davidson fleet, while towing the disabled barge Chieftain on Lake Superior on Sunday last, broke her steering gear, the two boats separating and drifting about helpless. Both vessels were picked up by passing steamers and towed to Duluth.

The Craig Ship Building Co. have called for bids for the erection of buildings and improvements to the water front at their new plant at Long Beach, Cal. Plans were prepared by Chief Engineer Baker of the Craig company. The cribbing and bulkheading in front of the plant will be 600 ft. long.

Maj. Graham D. Fitch, government engineer at Duluth, has instructed the bridge tenders at Duluth to report to him the names of the ships passing the Northern Pacific draw bridge which neglect to blow the necessary signal for the opening of the bridge, as prescribed by the rules. Major Fitch will notify the owners of the boats reported to him, and call their attention to the penalty which can be inflicted upon them for this negligence. The owners of offending vessels thus far are the Pittsburg Steamship Co., the Interlaken Co., S. P. Cranage, Farrar Transportation Co., Gilchrist Transportation Co., James Corrigan, and the United States Transportation Co. In view of the numerous and disastrous collisions which have occurred between vessels and bridges during the present season, Major Fitch is to enforce the rules vigorously.

OBITUARY.

Franklin Bates Polson, president of the Polson Iron Works, Ltd., of Toronto, died suddenly at his residence, Toronto, on Oct. 28, aged 50 years. He had latterly been subject to indigestion and had a severe attack of illness on the 27th, but seemed to be much easier just before his death. He was born at Port Hope, Ont., and after a long experience as an engineer, during which he filled several prominent positions in 1883, founded with his father the Polson Iron Works, which developed into one of the largest ship building and engineering establishments in Canada. The first steel steamship ever built in the Dominion was constructed by them for the Canadain Pacific railway and they have carried out many extensive government contracts. Mr. Polson occupied a prominent position in the commercial circles of Toronto. He was an active member of the technical school board and an enthusiastic yachtsman. He leaves a widow and five children.

Bids for the repair of the transport Logan were opened at San Francisco last week as follows: Union Iron Works, $295,452; Risdon Iron Works, $363,500; Heffernan Engine Works, Seattle, $408,311; United Engineering Works, $434,093; Moore & Scott Iron Works, $564.862. It is probable that contract will be given to the Union Iron Works, as its bid was not only the lowest but promised completion in the shortest number of days.

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THE MARINE REVIEW

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November 21, 1907.

A NATIONAL HUMILIATION.

It is announced from Washington that charters of foreign steamers to convey the coal required by the American battleship fleet on its voyage to the Pacific ocean are now actively being made, and that the movement of the coal has started. The British steamers Ribley and Towergate are to carry about 6,000 tons from Baltimore or Virginia to Punta Arenas, on the straits of Magellan, at $4.40 a ton. The British steamers Hermiston, Earl of Douglas and Falls of Orchy and the Norwegian steamers Hektor and St. Andrews will load 25,000 tons for Callao, Peru. The Norwegian steamers Tricolor and Thor and a British vessel have been chartered to convey about 18,000 tons from Baltimore or Norfolk to the navy yard at San Francisco at $5.75 a ton, or to Magdalena Bay at $6. The British steamer Mombassa has been engaged to carry 5,500 tons of coal from the Chesapeake to Manila Bay at $4.35 a ton. These steamers will all load and sail within the next month or six weeks.

Dutch and Italian ships have also been chartered, and the needs of the United States thus benefit Europe by propping up a weak ocean freight market. These foreign steamers, when they have delivered our navy coal on the Pacific coast, expect to load in British Columbia for Australia or the Orient, and discharging there, reload a third cargo for Europe, thus circumnavigating the world, earning three freights and returning satisfactory dividends to their owners.

But the vital point of interest to the American people and to their lawmakers in congress is the demonstration which is being given that the great, rich and powerful United States government of 1907 is unable to move its battleship fleet from American ports on the Atlantic to American ports on the Pacific without invoking the aid of foreign flags and foreign governments to convey the indispensable coal. And this is practicable only in a time of peace. In war the navy department could not use these foreign ships. It would be a violation of the laws and principles of neutrality and, more than that, it would be suicidal even if these laws did not prevent. For the owners, officers and crews of these foreign colliers would have no interest in risking their property or their lives in the American service. They could not be depended on to "play fair." They would scuttle for their home ports at the outbreak of hostilities, and we should be fortunate if the fuel which our gold had bought did not turn up at the naval stations of our enemy.

It should not be forgotten that though a few American steamers were offered to the government on time charter to San Francisco Bay, their total capacity would not exceed the amount of coal required by the navy there and would not provide at all for the 100,000 tons which must be loaded into the bunkers of our warships at the way stations along the South American coast between St. Lucia in the West Indies and Magdalena Bay in lower California. In a war emergency coal could be transported by rail overland to San Francisco and Puget Sound. But a battleship fleet cannot go around Cape Horn or through the Straits of Magellan without recoaling several times, and it must have ships, American ships, officered and manned by loyal American seamen, to convoy the fighting vessels and provide the coal without which, as Congressman Littlefield has well said, our armorclads are as idle and useless as painted ships upon a painted ocean.

This Pacific cruise of the battleship fleet is the most vivid object lesson of the need of a merchant marine that has come before the eyes of the American people since the Spanish war. Here we have built in our country an enormous navy, the second strongest navy in the world, and we have utterly neglected to supply it with its indispensable auxilary of a naval reserve of ships and seamen. In other words, we have been as blind as Russia, which built a lot of battleships without paying any heed to the necessity of an auxiliary fleet, with a large supply of trained and hardened sailors. Our republican government in this matter has shown itself every bit as ignorant and incompetent as the autocratic government of the Czar—or rather a large proportion of the members of our house of representatives have shown themselves as ignorant and incompetent.

The blame is not upon President Roosevelt or the members of his administration or the great and powerful leaders of the majority party in the United States. The responsibility for this demonstration of our maritime impotency which we are now making to the world rests squarely upon the

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shoulders of a portion of those representatives of the agricultural west and south who are now demanding that congress appropriate untold millions for deepening the waterways of the Mississippi valley. These are the men who have resisted every appeal of American presidents for a few million dollars annually for the encouragement of American ocean navigation. And these men need not be surprised if their demand for millions and millions of money for their own people and their own sections should now meet with a cold response from the people of the seaboard and commercial states, in view of the spectacle presented next December of the American battleship fleet convoyed by foreign colliers and enabled only by the courtesy of foreign governments to make the voyage from the American port of Hampton roads to the American bay of San Francisco.

FREIGHT SITUATION.

It looks as if navigation were to close in a week. Brokers are having difficulty in placing vessels, as nearly all the shippers are about through. The Steel Corporation will suspend shipment of ore from the mines on Nov. 30, and after this week practically no boats belonging to the fleet of the Pittsburg Steamship Co. will be sent from Lake Erie for ore. During the past few days the weather has been favorable to shipment of ore and a considerable quantity has been moved, but furnaces are not so well supplied that should weather conditions make it difficult to load, shipments will cease altogether. In fact, everyone feels that all the ore has been moved that will be needed for a long time.

Coal has been coming to Lake Erie docks a little more freely during the past week. Vessels that take coal to the head of the lakes this week will be laid up there. While more coal has been moved this year to Lake Superior than ever before, the consumption has been greater and the available supply is not large.

The grain trade seems to be practically at an end.

HIGH LEVEL BRIDGES IN CLEVELAND.

An important meeting of the harbor committee of the Cleveland chamber of commerce was held in the library of the chamber on Tuesday, Nov. 19, and was presided over by Harvey D. Goulder. The committee on bridges was present by invitation as were also the leading vessel owners of Cleveland. The general subject discussed was the height of viaducts across the Cuyahoga river, though Mr. Goulder desired it to be understood that the Lake Carriers' Association as a body was in no way identified with the movement of fixing a definite height for these structures. The purpose of the meeting is well expressed in the following letter which Mr. Goulder caused to be sent to all of the ship yards on the lakes:

"The matter of head room or clearance at fixed viaducts in Cleveland is before a committee of which I happen to be chairman. It looks as if at what is known as the Central viaduct a clearance of 100 ft. above the mean stage of water can be secured without special difficulty. At the Superior street viaduct it is claimed that so high a clearance as 100 ft. can only be obtained by having four per cent grade from Water street or else by extending the grade up as far approximately as Bank street. There seems no objection to a grade from Water street west to the bridge proper, except as lies in the practical question of the permissible or appropriate rate of grade. If practical limitation of the grade should require the beginning of the approach as far back approximately as Bank street, it would much inconvenience the adjoining property and the crossing of Superior street between Bank and Water streets.

"It is said that if ships could be accommodated with a clearance of 90 ft. a practicable grade will be had from Water street west.

"The desirability of having in the future fixed viaducts is mutually important to the ships and to those who have to pass over the river by means of the viaducts. A very distinct disposition of mutual accommodation seems to pervade the whole question with a view to obtaining fixed structures without draws giving ships the necessary clearance and at the same time reducing the grade to a point reasonably convenient and, as far as possible, economical in the erection and maintenance of the structures themselves and adapted to the convenience of those who are required to use them.

"The law requires a steamer to carry the head light 40 ft. above the hull, unless her beam is less than 40 ft., and then the limit is the beam of the boat. For the after range light the requirement is that it shall not be less than 75 ft. abaft and not less than 15 feet above the forward light.

"Some question has been made as to whether this is to be measured from the deck or the hull on even keel. As there is no reference to the deck or the hull in connection with the after light, but its height is merely required to be 15 ft. above the forward light, and taking into account the design to have a range consisting of the forward light and a higher after light, my understanding is that these lights should be so adjusted that in whatever trim the ship is the after light will be 15 ft. above the forward light for the purpose designed, that is, having a range.

"Our committee would be very much obliged if you would go over this question as carefully as your convenience will admit and give us such information as you can from the practical standpoint of the ship designer."

The replies to this letter were various, the most thorough being presented by Robert Logan, general manager of the American Ship Building Co., who held that the after light of a modern ship would be 87 ft. above the keel, and Charles Calder, general manager of the Toledo Ship Building Co., who figured it at 89 ft.

Dr. Charles S. Howe discussed the needs of the city, holding it to be divided into two parts, each a considerable city in itself, but that if both are to be developed to their fullest extent there should be free, full and uninterrupted communication between them. The bridges should be numerous and available at all times. A bridge with a draw is not available at all times, and is moreover a source of danger. He thought that all viaducts spanning the river should be high level bridges. No problem is involved in making the Central viaduct a high level bridge, but quite a serious problem is involved in the Superior street viaduct. If the bridge is to have a clearance of 100 ft. above water level it will necessitate a four per cent grade, starting from Water street. This grade could be achieved without perceptible damage to property. The grade could be lessened by starting the approaches at Bank street, but not without serious damage to property on Superior street. Any attempt to start the approach at Bank street would probably result in protest from property owners. A four per cent grade of course would make it impossible for teams to carry their present loads across the viaduct. He thought that if vessel owners would be content with 90 ft. clear-

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OHIO VALLEY IMPROVEMENT ASSOCIATION

The convention of the Ohio Valley Improvement Association held at Wheeling, W. V., on Nov. 14 and 15, marked the thirteenth milestone in the history of the association. In numbers and in enthusiasm it took rank with any former convention, and under the leadership of Col. John L. Vance, its courteous and popular president, this meeting contributed its quota to the progress of this great movement. Many old faces were recognized, and with them many new ones, and there was constant evidence that the work of education which has been carried on so vigorously is continuing to bring forth abundant fruit in constantly enlisting new recruits.

All of the sessions of the convention were well attended and close attention was given to the various entertaining speeches and addresses which presented the improvement from all points of view. Although but two days were consumed there was a night session on the first day, and as usual a large amount of business transacted. The report of the secretary and treasurer, Capt. J. F. Ellison, showed that the finances were in excellent shape, and the disbursements supervised in a careful and businesslike manner. The balance in the treasury evidenced that business men and organizations throughout the valley have not confined their interest in this important improvement to mere words of mouth, but have constantly and consistently backed up their endorsement in a financial way. It would take a volume to present the bristling array of facts and figures enumerated by speakers at the meeting, and only a cursory mention can be made of them here.

The convention was called to order Thursday morning, Nov. 14, in the auditorium of the Carroll Club, Wheeling, W. Va., which was suitably decorated for the occasion, an immense streamer "'On to Cairo" being hung over the proscenium arch. Large posters announcing the meeting of the National Rivers and Harbors Congress at Washington on Dec. 4, 5 and 6 next, were given a conspicuous place on the walls.

The convention was called to order by Mr. W. Alfred Wilson, secretary of the Wheeling board of trade, in the absence of H. C. Franzheim, its president. Mr. Wilson called attention to the absence of Mr. Franzheim, saying that he was out of the city and was not able to get there until the afternoon. He also spoke of the general regret caused by the absence of Gov. William M. O. Dawson, who was unable to reach Wheeling for the opening.

Hon. W. P. Hubbard, representative in congress from the First District of West Virginia, delivered an address of welcome in behalf of the city of Wheeling. After recounting the early struggles of the Association and its fight for life in which the people of Wheeling had had a part, he compared the association in its progress to the Ohio river itself, which broadening as it flows through the valley finally brings to the ocean the rounding completion of its work. The conservation of forests, the prevention of floods, the protection of streams and the drainage of swamps are all a part of the steady progressive movement of the country, in addition to the project for the deepening and broadening of the river channels. The waterways were neglected when the railroads first came, but now that the industrial growth of the country exceeds its transportation facilities recourse must again be had to the waterways, and congress should make appropriations for the improvement of our rivers with as much regularity as other appropriations are made. Only in this way can we make full use of the Panama canal. He referred to the navigable waterways as the greatest asset that the country can have. Adverse public sentiment to internal waterway improvement has now entirely disappeared, as well as the opposition of other transportation interests, and substantial encouragement is being given on every side. The speaker paid a high tribute to the great work performed by the Ohio Valley Improvement Association in paving the way for other similar associations throughout the country. A hundred congressional districts will be benefited by the carrying out of this project, and the time will come when all of the delegates will be able to come back to Wheeling by water on a 9-foot stage, and will be accorded just as warm a welcome as at the present time.

Mr. Edwin C. Gibbs, of Cincinnati, responded to the address of welcome, holding it most proper that the convention should meet in Wheeling, the first town laid out on the Ohio river. After recounting some of the early history of Wheeling he prophesied its rapid growth in the future when the improvement of the Ohio shall have been brought about, and in closing paid a high compliment to the services of the various officers of the Ohio Valley Improvement Association and referred to pronounced change in public sentiment during recent years in favor of this movement, due primarily to the work of this association. Although the Ohio river at this time occupies the first position, it will take hard and persistent work to maintain it as such before the rivers and harbors committee in the future. The time of planting has gone by, and it is now time to gather in the harvest of our labors.

Colonel Vance read a letter from Mayor Schmidt in which he expressed much regret at his inability to be present at the convention and his earnest and sincere hope for the success of the efforts.

PRESIDENT VANCE'S ANNUAL REPORT.

The annual report submitted by President Vance was a comprehensive document reviewing the work of the year. In the opening of the report President Vance after referring to the active work of those connected with the association and acknowledging the cordial support of the members in every section, commented on the fact that the entire country is now awakened to the importance and necessity of improved waterways, particularly the great inland waterway. He took pride in attributing this awakening in large part as due to the work of the Ohio Valley Improvement Association, which has labored continuously and persistently for more than thirteen years, undaunted by difficulties and opposition that at times seemed insurmountable and which would have proven disastrous but for the unwavering confidence of the members of the association in the justice of their cause. Their efforts must be continued until results have been secured beyond possibility of revocation.

President Vance enumerated certain appropriations heretofore made, and the distribution of same, congratulated the association on the benefit these would produce in enhancing the commerce of Ohio. The amount of money appropriated by the act of March 2, 1907, is larger than that for a like purpose in any preceding river and harbor bill in the history of the country. The act is also admitted to be the most valuable and comprehensive in all its parts. Provision is made for the completion of a much larger proportion of projects

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than in any preceding measure, and the result is the providing for important works that have been pending for years.

President Vance referred to the creation by President Roosevelt of what is known as the inland waterways commission, and explained its personnel. President Vance thought that it is the universal opinion that the president's appointment of this commission for the purpose specified is the most important in its bearings of any he has taken during his administration for the benefit of the commercial interests of the country, and he thought that in this action President Roosevelt had been largely influenced by the results of the convention of the National Rivers and Harbors Congress held at Washington Dec. 6 and 7, 1906, and which was in numbers and influential delegates the most notable ever held in the United States for the purpose of advocating the improvement of internal waterways. The work of this commission will be watched with interest by the people of the entire country. Colonel Vance anticipated that the report of the Board of United States engineers setting forth the results of their examination and survey of the Ohio river will no doubt be presented to congress at the approaching session. President Vance reviewed the proceedings at the hearing of the board of engineers for rivers and harbors at Pittsburg, Pa., on Aug. 12 last, at which there was a large and representative attendance. President Vance believed that there is today a greater and more widespread sentiment in favor of waterways improvement than ever before in the history of this country. Influential newspapers and magazines in every section, many of which have in the past given but slight attention to this class of public improvement, are now open and avowed advocates for the special waterway improvement that most concerns their locality. He complimented the work of the National Rivers and Harbors congress through its well established and carefully handled bureaus of publicity, aided by speakers of undoubted prominence and ability, who are building up a sentiment favorable not to any particular project but to a policy by the national government which when consummated will be of direct and permanent benefit to every section having a just and meritorious claim for river and harbor improvement. He held that among these the Ohio river improvement stands without a rival, because it is the one river in this country that carried tonnage from its source to its mouth, the volume of which is greater than that of any unimproved river in the world. The West Virginia Board of Trade in session at Elkins in October, adopted a report and resolutions relating to waterways, through a committee of which Hon. W. P. Hubbard was chairman, which is an able and convincing argument in behalf of the improvement of waterways that will command unqualified commendation.

The report of the secretary and treasurer, Capt. J. F. Ellison, of Cincinnati, showed that the finances were in excellent shape and that the association has abundant resources to carry on its aggresive campaign.

ADDRESS OF CONGRESSMAN DALZELL.

After recess John Dalzell, M. C. from the 30th Pennsylvania district, now addressed the convention. He paid a high tribute to President Vance and said that all hoped he might live long enough to see the fruition of his life's work. He paid an encomium to Capt. Dovener, who had always worked for the improvement of the Ohio river. In the present period of greatly increased production along all lines the question of transportation is paramount, the railroads being inadequate to take care of the production. He quoted the statement of James J. Hill regarding the greatly congested condition of the business of the country, to relieve which it would require the building of at least 73,000 additional miles of railroad that would cost over $5,000,000,000. The Ohio river serves a population of over 15,000,000, and at the head waters of the Ohio there is produced more coal than France, Belgium, Great Britain and Germany. More steel rails are produced in Pittsburg than are made across the water. Pittsburg makes more plate glass than the whole of the balance of the United States, and produces more petroleum compound save Russia and the rest of the United States. The Pittsburg district furnishes 60 per cent of the coke in the United States and makes most of the crucible steel, tubing and many other products. The tonnage of the Pittsburg district annually exceeds the aggregate tonnage of five of the world's great ports, New York, London, Liverpool, Hamburg and Antwerp. Last year it reached the amazing figure of 123,000,000 tons. All this tremendous output is dependent for its transportation on the inadequate railroad facilities and the uncertain facilities that are afforded by the Ohio river in its present unimproved state. Any of the other cities along the Ohio will almost equally well illustrate the urgent necessity for the improvement of the river as well as of its tributary streams. The speaker then showed the immense difference in cost in favor of water transportation, stating that one steamer recently towed from Louisville to New Orleans 70,000 tons of coal at a cost of one-third of a mill per ton per mile. While the trip was made as expeditiously in all probability by water as it would have been by rail, the water cost was only one-twelfth of what the rail cost would have been.

SPEECH OF CONGRESSMAN FOSTER.

Hon. John H. Foster, M. C. First Indiana district, stated that he agreed with President Roosevelt that the time for speaking is past and the time for action has come. The country has been railroad mad, and transportation by water should now be given more attention. Mr. Foster believed that appropriations in the future will be more liberal, because the people have been educated to demand them. The position of the Ohio river in the center of population and production should justify its receiving the first attention of congress. Even in its present condition it has a greater commerce than any other river, and it should be first improved because it is going to furnish the greatest tonnage to other rivers. With the Ohio river improved it has a potentiality, at Evansville and at other points, for 20 Pittsburgs. In conclusion Mr. Foster pledged his continued support.

Judge Lewis M. Hosea, of the superior court of Cincinnati, briefly addressed the convention. He said that it needs no gift of prophetic vision to see what the improvement of the Ohio means. It will fill the valley with a great number of contented manufacturers who will have no trouble with trusts, as the Ohio river gives no rebates, and with the outlook for the population to be doubled in the next 40 or 50 years, the need for improvement is manifest. Judge Hosea stated that at the biennial session of the Ohio legislature he found that the entire senate was in favor of abandoning the canal system, but believing that the canal in connection with the Ohio river would be one of the greatest blessings to all industries, through the efforts of himself and others he had succeeded in bringing about a complete change of sentiment, so that the canal was not abandoned.

VALUE OF SHIP CANALS.

John E. Shaw, president of the

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Ohio River Ship Canal Company, declared himself as one who was tired of pessimism. He had great faith in Uncle Sam even if he had lately stubbed his financial toe. He believed that the country is about to enter upon the greatest period of expansion in wealth of production in the two hundred years of our history. In building a house we must first ask, "Can we afford it, will it add to our comfort, convenience and happiness;" and the government in the building of a waterway system must take the same view.

In 1850 the products of the country were valued at $7,000,000, and in 1907 the mineral products equaled half of those of the world, or an increase of 200 per cent, and the country has but 5 per cent of the population of the world. In 1880 we passed England in the rank of manufactures, and since then we have passed in everything else, and every sunrise sees $10,000,000 added to the tangible wealth of the country, and in other words the result of six days would provide 9 feet of water from Pittsburg to Cairo. Can we afford it? It doesn't need any answer.

"The building of waterway improvements should first be along the lines of already moving tonnage. In this country the currents of freight shipments are from east to west. From New York city to Beaver, the mouth of our proposed canal, is 750 miles by water. Add the Ohio river to that and you have an east and west line of 1,660 miles to the Mississippi, and from Beaver to Lake Erie makes possible the shipment of the southern products to New York by water in place of being bottled up at Pittsburg. This makes the imperative demand for the immediate improvement, and when this is done it will be possible for 24 states to interchange their products on water and at a cost for moving it seven miles of the cost of one mile by rail.

"Does the money put in locks and dams pay? The Suez canal cost $100,000,000, and the tonnage is about that of the Ohio river, and its net receipts have at times been as high as $20,000,000 a year, and its stock is higher than that of Standard Oil. Then look at the Panama canal. At the close of the century it should have an income of $48,000,000 annually if it grows in the same proportion as the Suez.

"The Lake Erie ship canal will cost $60,000,000, and right along where we propose to build the canal is moving about 60,000,000 tons of freight a year. Over 50 per cent of the Detroit river tonnage is from Pittsburg, and the Pittsburg tonnage has doubled itself in six or eight years.

"As to the system, I suggested a belt line waterway in the country, and I believe that those that have the tonnage now should first be built. It touches the grain and oil centers of the northwest, the cotton and sugar of the south and the coal and coke of the east, and has an outlet to the Gulf and to the Atlantic. From this belt line waterway we see the extensions that are possible and the Lake Erie ship canal comes first in importance, but is eliminated, as it has been given by the government to private people to build. That leaves the Ohio then first, and it stands out pre-eminently as the first in the good it would do to the government. The third should be the extension of the Chicago drainage canal."

Referring to the ship canal, Mr. Shaw stated that the company was ready to take up the construction as soon as the financial matters adjust themselves, and continued: "I wish to say that there are men here today who will not only see the Lake Erie & Ohio canal built and the Ohio improved, but they will enjoy the fruits of them. I have great faith in Uncle Sam, and he will soon be up and doing and accomplish greater things than he has ever accomplished."

NOMINATION OF OFFICERS.

For President—John L. Vance. For Secretary-Treasurer—J. F. Ellison. For Vice Presidents—W. B. Rodgers, Pittsburg, Pa.; Jas. A. Henderson, Pittsburg, Pa.; Jno. H. Jones, Pittsburg, Pa.; Hullinen Quarrier, Wheeling, W. Va.; D. A. Mossman, Huntington, W. Va.; B. W. Peterson, Wheeling, W. Va.; B. S. Pope, Parkersburg, W. Va.; Albert Bettinger, Cincinnati, O.; H. A. Marting, Ironton, O.; D. J. Sinclair, Steubenville, O.; J. E. Williams, Portsmouth, O.; W. W. Hite, Louisville, Ky.; W. A. Patton, Catlettsburg, Ky.; S. A. Fowler, Paducah, Ky.; W. C. Williams, Louisville, Ky.; F. B. Posey, Evansville, Ind.; M. C. Garber, Madison, Ind.; Chas. Hegewald, New Albany, Ind.; I. H. Odell, Evansville, Ind.; Geo. Parsons, Cairo, Ill.; J. C. Willis, Metropolis, Ill.; E. A. Smith, Cairo, Ill.; J. F. Browinski, Joppa, Ill. Executive-Finance Committee—Edwin C. Gibbs, chairman; John L. Vance, Geo. Puchta, O. F. Barrett, Paris C. Brown, J. F. Ellison, Albert Bettinger, M. B. Farrin.

THURSDAY EVENING'S SESSION.

At the night session on Thursday the first speaker was Hon. W. E. Cox, M. C. third Indiana district. He paid a glowing tribute to the pioneers in river improvement movement who so manfully struggled for many years against indifference and opposition. He commented on the fact that the increase of production in this country exceeds by 100 per cent the increase in railroad transportation facilities, and a continuous stage of water in the Ohio and Mississippi rivers, as well as the completion of the Panama canal, is urgently required. He pledges his own support for the cause in congress and out of congress, as he believed that the people were educated and ready for the improvement of the Ohio river.

Hon. James A. Hughes, of the fifth West Virginia district, said that his specialty was not public speaking, but being in the lumber business he belonged rather to the log rolling class. Some 50 congressional districts are interested in this improvement, and if the members from the other 49 would take the same interest as the speaker it will not be a hundred years before the improvement is made, but less than 10 years. If a guarantee could be given to the river men that in 10 years' time the river would be improved so as to carry a continuous 9-foot stage, fast and fine boats would be constructed and competition with the railroads assured. The average travel of a freight car is 13 miles a day, and at Huntington it is calculated that a steamboat is 10 days quicker than rail on shipments from Pittsburg. There is now a large amount of money in the United States treasury, and it can be expended in no better way than for river improvement. He complimented Congressman Dalzell on his speech and wished that he could have gotten the same man to write his. He favored an annual river and harbor appropriation, and pledged his support to it. He was proud of his home town having had the largest delegation to the last rivers and harbors congress.

Hon. W. M. O. Dawson, governor of West Virginia, was the next speaker, and after apologizing for his tardy arrival and explaining the cause of his absence to be due to failure to make railroad connections, he referred to the great natural resources of West Virginia and the possibilities for its great development consequent upon the completion of the Panama canal. West Virginia coal is the finest in the world, and would be preferred

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in any market if it were given equal advantages as to transportation cost. West Virginia is now shipping over 30,000,000 tons of coal per year, and it costs on an average $1 per ton to ship it to market. What would be the advantage to West Virginia if this transportation charge could be reduced even as little as 10 cents per ton? When you reduce the cost of transportation you add to the material wealth of the country. The speaker had sometimes thought that it would be better for the state if not so much coal were mined at present, for ultimately when the cost of transportation shall have been reduced by internal waterway improvement, the worth to the producer will be more. The Big Kanawha and the Big Sandy are somewhat improved and the Monongahela to Fairmont, and now we need the Ohio improved. The river should be improved continuously and not scattering here and there. What would you think of a railroad that was built in parts and attempted to be operated with the alternate sections unbuilt? Until the entire river is improved the full value of the investment will not be realized. The speaker had suggested three years ago that the government issue bonds and go ahead and complete the work simultaneously at different points. If there are other rivers as necessary to be improved as the Ohio, then let the bond issue be extended, but only provided the money itself is not available. We want the entire thing completed, not a dam here and there, but the whole d——d thing! Congressman Hughes here interrupted with the statement that they had money enough without recourse to bonds. In conclusion the governor said he would remain in the city for the day, and would go with the delegates to inspect the dams Nos. 11 and 13.

Ex-Governor A. B. White was called on, and responded in a few happy remarks, favoring the continuous contract system as the best means of bringing about desired results.

CAPT. DOVENER'S SPEECH.

Capt. B. B. Dovener, whose devotion to river improvement in the past is well known, congratulated the convention on the large attendance and the evidences of enthusiasm generally throughout the country. He referred to the interest he had always taken in this movement for the improvement of the Ohio river, and the fact that he had attended the first convention of the association and had attended every meeting since. He believed that the manifest strong public sentiment now aroused would result in still larger appropriations, and hoped that all the friends of the improvement would stand by it loyally to the end.

The closing number of the program of the evening was a lantern slide lecture by J. Frank Tilley, descriptive of the locks and dams on the Ohio river. It showed various stages of construction and the operation of various types of dams. All the dams now completed were shown, as well as a river tow in process of making, the Pittsburg harbor and the various classes of craft. The Sprague, with its tow of 54 pieces, was shown on the Mississippi. During the course of the lecture views of various well-known Ohio river improvement enthusiasts and past workers in the great movement were thrown on the screen, provoking great applause. Among these were the lamented Capt. John F. Dravo, Col. John L. Vance, Capt. Albert Bettinger, Capt. Jas. F. Ellison and others.

FRIDAY MORNING'S SESSION.

On Friday morning immediately after the opening letters of regret were read from Hon. H. C. Woodyard, of Parkersburg, Hon. H. R. Warfield, of Morgantown, Senator E. C. Colcord, of Morgantown, ex-Gov. G. W. Atkinson, and Hon. Joseph E. Ransdell, the president of the National Rivers and Harbors Congress, who invited all to attend the meeting of that body to be held at Washington, D. C., on Dec. 4, 5 and 6, 1907. He said that when he in conference with his colleagues should frame a bill for river and harbor improvements he could cast his vote for the improvement of the Ohio river with an easy conscience and with the certainty of splendid results.

Gov. Atkinson, now Judge Atkinson, in his letter spoke of the convention held at Wheeling in 1898, when he stated to the association that the tonnage and general traffic of the Ohio river exceeded that of any other river in the world, and he stated that the same is true today. Within the past ten years the railroad business of the country has increased 110 per cent, the railroad mileage 21 per cent, and the other equipment in about the same proportion. This means with the present enormous production that we must look for better waterway means of transportation; and the writer then pointed out the importance of the Ohio and Mississippi valleys as being the greatest agricultural and business districts of the country and most in need of relief in matters of transportation. In answer to the question, "Does it pay?" it is manifest that river improvement has paid in every other case where applied, and it will pay particularly well in the Ohio valley for obvious reasons.

An invitation to visit dam No. 13 was received from the Hillenbach & May Contract Co. of Evansville, Ind., and was accepted.

Congressman Hughes paid a high encomium upon the work of Hon. Theodore E. Burton on the rivers and harbors committee, and on motion of Hon. Albert Bettinger, one of the vice presidents from Ohio, a resolution was unanimously adopted expressing the debt of gratitude felt by the people of the Ohio valley in particular and of the country at large, to Hon. Theodore E. Burton for his intelligent and studious attention to the subject of improvement of the waterways of the country. Capt. Bettinger expressed his belief that no man in public life has done more for the tremendous advancement lately made in this important direction.

RESOLUTIONS ADOPTED.

The following submitted by the committee on resolutions, Hon. W. P. Hubbard, chairman, was unanimously adopted:

The Ohio Valley Improvement Association, in its thirteenth annual convention assembled at Wheeling, W. Va., Nov. 14 and 15, 1907, reaffirm the declaration of principles approved by the association at its meetings in Parkersburg, 1902; Evansville, 1903; Huntington, 1904; Cairo, 1905; and Portsmouth, 1906.

First. We affirm as the sense of this association that the improvement of the Ohio river from Pittsburg to Cairo should be such as to provide a 9-ft. stage at low water; for the completion of which we respectfully ask that all appropriations necessary be made at the earliest practical time.

Second. This association advocates that improvement of the Ohio river be made according to the report and recommendation of the United States engineers approved by the secretary of war, and that when work is begun on a lock and dam it should be completed as expeditiously as possible.

Third. The promptness with which the United States engineers' commission, appointed to report generally upon the permanent improvement of the Ohio river, prosecuted the work assigned to it, and the open and fair manner in which the United States

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Engineers' Board of Review proceeded to review said work and report, deserve and have the hearty commendation of this association, and to the end that said reports now on file with the chief of engineers may receive equally prompt attention by the congress of the United States, we hereby respectfully request the Hon. William H. Taft, secretary of war, to transmit the same to congress at the earliest possible date after the commencing of the coming session of that honorable body.

Fourth. We note with much satisfaction the constant growth of sentiment throughout the country for the improvement of our waterways, brought about in great part through the efforts of the National Rivers and Harbors Congress, wherefore, it is resolved that we continue our support of the said National Rivers and Harbors Congress in its efforts to establish permanently the policy of annual appropriations of not less than $50,000,000 for rivers and harbors improvements.

Fifth. That every delegate present at this convention pledge himself —either by personal interview or by letter, to urge the senators of his state and the representative of his congressional district, to urge vigorously the passage of a rivers and harbors bill at the coming session of congress. That the secretary of this association advise the senators and congressmen of the states of Pennsylvania, West Virginia, Ohio, Kentucky, Indiana and Illinois of this action of the association and convention assembled.

Sixth. That whatever scheme of improvement of the lower Ohio may be adopted pursuant to the report of the board of engineers, the locality below the mouth of the Green river, and the locality between the mouth of the Tennessee river and Cairo, should be given preference.

Seventh. Until the completion of the permanent improvements of the Ohio river, low water navigation is greatly benefited by the judicious use of dredging in times of low water Congress has promptly and generously responded to our previous request for provision for such dredging, and for this we hereby extend our thanks, with the hope that the policy of low water dredging may be continued.

Eight. We herewith renew our protest against the maintenance of narrow channel spans across the Ohio river, and commend the action of the war department in enforcing the laws of congress for the removal of such obstructions. We heartily endorse the plan proposed by the United States engineer's department for a bridge at Steubenville to replace the one now maintained by the P. C. C. & St. L. Ry. Co., so dangerous to navigation.

Ninth. This association recommends the maintenance by the government of an adequate force of engineers to be available for the prosecution of river and harbor improvements, to which end is suggested the appointment or employment of civil engineers from private life when necessary.

Tenth. This association expresses its thanks to the committee on rivers and harbors for the courtesy and kindness with which it has uniformly treated the representatives of this association who have appeared before that committee. We appreciate the great care and skill with which the engineers have dealt with the problem of the improvement of the Ohio river. We feel that they have solved the problems presented, with scientific accuracy, and have made no mistakes in the work heretofore done.

Eleventh. We commend the state of Ohio for its action in preserving its canal system. We urge that state not to abandon any of its canal property, but on the contrary to convert its present canals connecting Lake Erie with the Ohio river into barge canals to the accomplishment of which we pledge our hearty support.

ADDRESS TO THE HYDROGRAPHER.

Mr. M. O. Leighton, hydrographer of the U. S. Inland Waterways Commission, addressed the convention, saying at the outset that as there might be some misapprehension as to the exact scope of the duties of the commission, a word on that head would be in order. He explained that these duties were purely of a deliberative and advisory character, to place the president in possession of such data with regard to the general subjects committed to the commission, as the president, through absorption in his other multitudinous duties, might otherwise be unable to obtain. The commission was not for the purpose of advising congress, but rather the president himself, whose creation it was. It was not the intention that this commission should usurp any of the powers of congress, but to advise the president what was best for him to represent as to these subjects in his message to the congress. It is not reasonable to suppose that this commission can present a final report on these momentous matters and prepare same within the short space of nine months. He then commented upon the peculiar fitness of each member of the commission, they being selected from such various walks and viewpoints as to enable the combined commission to have the benefit of their combined experience greatly to the advantage of the entire body as a whole. The commission has no particular project in mind, and has no right to consider any particular project. The speaker then briefly treated of the prevention of floods by means of reservoir systems of storage of water at head waters. The commission would consider water power, navigation and stream polution. The speaker believed that there was every prospect of so utilizing the water power to be derived under his plan to make the same defray the expense of maintenance of the locks and dams that may be constructed. The utilization of the water power now going to waste meant the avoidance of a coal famine, which is now predicted at present rate of consumption within 70 years. The preservation of our forests is also a subject that is deeply connected with the question of internal waterways. He held that unless proper terminal facilities are provided water transportation will be greatly hampered.

COL. POSEY TALKS.

Col. Frank B. Posey, of Evansville, Ind., entertained the convention with one of his characteristic talks, full of wit and homely illustration. He literally brought down the house. In introducing him Col. Vance referred to Col. Posey as a "veteran in the cause of river improvement," and Col. Posey said that he could remember the time not so many years ago when Col. Vance was expounding the need of improving the river his appeals apparently falling on unwilling ears; he should, therefore, now feel all the greater sense of gratification that the whole country has taken up the movement for the betterment of internal waterways and that even President Roosevelt himself is in the fight heart and soul, and that the cause is being advocated by the leading public men and journals of the country. Col. Posey made the point that inasmuch as the gift of West Virginia was originally made to the Northwestern Reserve by the state of Virginia conditioned on the maintenance of open navigation of the Ohio river, that the government is under an implied trust to improve the river, since its navigation never can be free in the highest sense of the word other-

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wise. The value of this river for navigation purposes is beyond conception, and if put up for sale a private corporation would be found that would put up $100 000,000 for the right to construct all necessary locks and dams, and when completed to charge a toll for navigation. Col. Posey's remarks were in an exceedingly happy vein and he was roundly applauded.

Rev. John McCarthy, of Huntington, spoke in introduction on the unselfishness of the practice of medicine and compared it with the services of an engineer, and declared that George Washington received his ideas as to a united country from his experience as an engineer when he explored in the Ohio valley. Congress of itself cannot do anything without pressure from the public, "and that's what we're doing here. Congress can't do anything without us," he said.

Rev. Mr. McCarthy spoke a word of praise for President Roosevelt for raising politics out of pettiness, and he said (speaking as a democrat who voted against Bryan) the Nebraskan was a force behind Roosevelt in this. He took up the work of other engineers, speaking of Lyman E. Cooley, who said "the minimum of transportation required in the United States is one mile of canal for every three miles of railroad," and cited what had been done in other countries. He offered proof to show the coming of the needs of increased water facilities. Rev. Mr. McCarthy declared that the Ohio Valley Improvement Association is engaged in a Christian occupation, so it is entirely appropriate for a minister of the gospel to be present.

Louisville was selected as the place for the next meeting.

The convention adjourned at noon on Friday, and the afternoon was devoted to an inspection of dams Nos. 11 and 13, the trip being taken by trolley and steamboat Royal. An excellent opportunity was enjoyed of inspecting a movable dam partly completed at No. 13, of the Chanoine wicket type. While water was not flowing over the wickets, a much better chance was had to see the actual mechanism than could have been had were the dam actually in operation.

The selling of tickets via the D. & B. line between Detroit and Buffalo has been discontinued. Steamers of the D. & C. line will continue to run daily between Detroit and Cleveland until Dec. 5. The steamer City of Mackinac made her last trip to St. Ignace on Monday last.

THE TRIALS OF THE MAURETANIA.

The Mauretania finished her official trials on Thursday morning, Nov. 7, when she entered the Mersey with the credit of being the fastest merchant steamer in the world. For just over 50 hours she steamed at an average speed of 25.03 knots, and later—on Wednesday—made a series of progressive speed runs on the measured mile at Skelmorlie, on the Clyde, including two runs at a mean speed of 26.04 knots. The Mauretania ran her 48 hours' trial on a course of 304 nautical miles—between Cornwall Point light, on the Wigtonshire coast, in Scotland, and the Longship lighthouse, in Cornwall, England. She began, says *Engineering*, with a mean draught of 32 ft. 9 in., which corresponds to a displacement of 37,000 tons—the condition the ship will be in at the beginning of her second day out from Queenstown. The draught conditions, therefore, assimilated to those in mid-Atlantic. We have, therefore, here a measure of the possibilities of the ship under the most favorable conditions, and with a well organized and adequate staff of trained officers and men. The results on the run may be first tabulated:

	Distance, Miles.	Time h.	m.	Speed, Knots.
First (southwards)..	304	11	34	26.28
Second (northwards)	304	12	2	25.26
Third (southwards ..	304	11	6¼	27.36
Fourth (northwards).	304	12	2	25.23
Total and mean speed				26.03

The course was selected because its length could be traversed in about 12 hours, so that tidal influences on the north and south runs would balance each other. The chief consideration was the maintenance of steam, and from first to last the machinery worked splendidly. The coal was partly South Wales and partly Yorkshire. The stoking was well organized. In view of the large power developed it should be stated that at no time did the draft pressure in the ash-pits exceed ¾ in. The steam pressure was well maintained, and the mean for the 48 hours' trial being 180 pounds. The turbines worked with remarkable steadiness. On the 48 hours' trial they started at about 186 revolutions, but steadily increased, and for hours ran 193 to 194 revolutions, with very light variation. The maximum reached was 198 revolutions. The significance of this result will be better appreciated when it is here recalled that the weight of the revolving mass in the low-pressure turbine casing, for instance, is 125 tons, that the peripheral speed was about 9,350 ft. per minute, and that the clearance was only 8.100 in. In the case of the high-pressure turbines it was less. This long-distance trial terminated on Tuesday evening about 8 o'clock, and the vessel anchored until the morning near to the Skelmorlie measured mile, to await daybreak for the carrying out of a series of progressive speed trials. Runs were made at progressive speeds from 18 knots to full speed, and it was specially remarkable that the last, as shown in the table, were confirmative of the 48 hours' trial, revolutions averaging the same—190—and speed 25.04 knots. It was next decided to make runs between Holy Isle light and Ailsa Craig light, further down the Firth of Clyde, where there was more sea room, and the mean of the two runs there made was 26.17 knots. The results are tabulated:

Direction—	—Time— min.	sec.	Speed, Knots.
Northwards	3	13	18.65
Southwards	3	20	18.00
Mean speed, 18.32 knots; mean revolutions, 123 per minute.			
Northwards	2	50	21.17
Southwards	2	54	20.69
Mean speed, 20.93 knots; mean revolutions, 139 per minute.			
Northwards	2	35 1/2	23.17
Southwards	2	40	22.50
Mean speed, 22.83 knots; mean revolutions, 156 per minute.			
Northwards	2	21 2/5	25.46
Southwards	2	19 2/5	25.82
Mean speed, 25.64 knots; mean revolutions, 180 per minute.			
Northwards	2	21	25.53
Southwards	2	15 1/2	25.54
Mean speed, 26.04 knots; mean revolutions, 190 per minute.			
Ailsa to Holy Isle	37	35	25.60
Holy Isle to Ailsa	35	54	26.75
Mean speed, 26.17 knots; mean revolutions, 192 per minute.			

This completed, says *Engineering*, the interesting day's work, in the course of which opportunity was afforded of testing the governor gear. This gear is normally set to come into action in the unlikely event of any of the turbines exceeding 230 R. P. M. The steering mechanism also proved most satisfactory, and with rudder hard over, and all propellers running ahead, the diameter of the turning circle was but 2¾ lengths—a very good result. Excepting for the swell from the Atlantic which was experienced when the vessel was running between the Tuskar and the Longship on her four measured-distance runs, there was no opportunity of testing her behavior in a seaway. The periods of the roll and of the pitch were, however, found to be so long that even the maximum amplitude possible need not be disturbing to passengers. The period of the single swing varied from 10 to 12 seconds, according to the weights on board and their distribution, and that of the single pitch was about 4 seconds.

An announcement is made by the Cunard Steamship Co. that the new giant liner Mauretania covered 1,200 miles in her trial run, and made an average speed of 26.03 knots. The time which would be necesary to make the trip across the Atlantic at this speed would be four days and ten hours.

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SITUATION AT BUFFALO.

Buffalo, Nov. 19.—Fall and winter problems are crowding in on the vessel owner again. They are in some instances pretty hard to meet, especially as the needs are so peculiar. At present the size of the winter fleet and the amount of winter grain storage are puzzling both the vessel owner and the elevator owner, if not also the grain shipper. Be it known, then, that Buffalo harbor is in just about the same condition for the undertaking that it has been in recent falls and though there is no certainty of a big winter fleet, either loaded or not, it is so likely to turn out about as usual that every effort is already making to find room for everything that offers.

The elevators have made their terms with the railroads during the past week and it is arranged that after Nov. 30, all grain in elevator will be forced into winter storage if it remains 10 days without being ordered out. This means 2 cents a bushel in the steel houses and 1¼ cents in the wooden, with additional insurance in the latter about enough to make up the difference. In fact that is the reason for the difference. These charges will no doubt give the harbor its usual big fleet to lay up loaded, for the nominal charge for winter storage afloat is only a half cent a bushel, added to the charter, though the owner of the grain quite often finds on arrival here that he wants to ship it on and unloads it at once, or at least in a month or two, when the vessel is ready for coal.

The railroads are doing quite a good deal better in handling grain than they were, sometimes furnishing cars in three or four days from the time of ordering them, instead of being 20 days behind their orders, as they were a month or so ago. They have already moved the 4,000,000 bushels that they were ordered to handle by the State Public Service Commission and are again contracting through grain about as usual. The elevators are pretty full, but there has not been the usual increase of receipts, the amount running about 3,000,000 bushels a week. There is complaint that much of the grain that would come here if the roads were equal to handling it is going to Georgian Bay ports.

Receipts for the season are a trifle more than for last season to date, being a little more than 100,000,000 bushels in each season. The additional handling for shipment out is probably due to the eagerness of the roads to stand well with the Public Service Commission and the resumption of business by the canal, after being tied up nearly two months by the break at Syracuse. Business is good enough to enable the canal to charge 5½ cents on wheat to New York, while carrying over three-quarters of a million bushels a week.

As to the harbor situation there is no change except that the vessels will average larger than ever before. There is no more room for winter stalls. The elevators and coal docks are holding off about taking lay-ups, for they have of late years, become more and more given to running during the winter. If they lease room to vessels they must wait till April 15 before they can do anything.

It looks now as though the coal docks would not like to pledge themselves to lay up till that time. They need a good-sized fleet to load before navigation opens in order to get as much done through the season as they need. They are over 700,000 tons in advance of last season now and all report that they are just as far behind their orders as they were last fall. To get this lead on former seasons they have strained every nerve for a long time and there has not been a slack spell from the start. Since July 20, the amount has fallen below 100,000 tons a week slightly for five times and it has not gone above 118,000 tons but once, the average being more than 100,000 tons a week for the whole time. This means that the docks have done all the business they could get, right along. They have been cut down both by car and mining shortages and the prospect is that last spring's loading of 250,000 tons before the opening of navigation will be exceeded next spring, beginning by mid-winter perhaps, if the coal and the room can be had.

The government has for some reason failed to rebuild the breakwater that was broken through by the big winter storm, having just fairly got started on it as the fall storms came on. The plan of tying up out there will not be given up for all that. There is plenty of breakwater that is sound and besides when the inner harbor is full there is nothing else to do. There is a move to secure money for deepening the entire outer harbor to 23 feet and when the chamber of commerce committee goes down to Washington to urge more liberal appropriations for such things it is likely that point will not be forgotten. This means that the inner harbor of any lake port is too small to make much of a show of taking care of the winter fleets, for Buffalo is as good as any and will look for the usual grain fleet.

Some day, when Buffalo gets through tangling up with railroad influence and politics and settles the question of deepening Buffalo river a few miles further, this harbor will be made much larger than it is. The work of digging the Niagara ship canal is progressing, though slowly, for it is mostly a hard rock problem, and then a harbor of some miles will be provided besides. The foresight of building the four-mile breakwater really saved Buffalo a bad shortage of winter harbor room.—JOHN W. CHAMBERLIN.

THE KELTON'S LONG TRIP.

The lake steamer Minnie E. Kelton has safely reached San Francisco after a journey of 16,467 miles. The steamer left Milwaukee on May 15. On June 4 she put into North Sydney, Cape Breton, with her boilers leaking. The steamer continued the long trip June 18, but her main mast breaking July 19, when she was 85 miles southeast of Santos, Brazil, she put about under sail and made that port July 28 without assistance. Leaving there on Sept. 11 the run to Punta Arenas, in the straits of Magellan, was made without incident, and only a day was spent there before resuming the trip. Coronel, the coaling port of Chile, was reached Oct. 6, and after taking in coal the Kelton sailed again two days later.

The only incident relieving the monotony of the long passage was the short visit paid to the island of Juan Fernandez, off the coast of Chile, where "Robison Crusoe" is supposed to have spent many years of his life.

The Kelton arrived there Oct. 10, remaining only a few hours after taking aboard fresh vegetables and fruit. That was the last stop until the steamer dropped her anchor in San Francisco.

MR. FARRINGTON'S APPOINTMENT.

Lake interests will be interested to know that W. C. Farrington, for many years president of the Northern Steamship Co. with headquarters at Buffalo, has been elected vice president of the Pacific Coast Steamship Co., and also of the Pacific coast railway, with headquarters at San Francisco. Mr. Farrington was latterly vice president of the Marine Insurance Co. of New York.

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QUESTIONS FOR MASTERS AND MATES.—NO. 49.

656. What is the proper way of laying up a compass for the winter?

657. Is it best to put all the compasses near together in storing them?

658. After your boat has laid in one direction all winter, is it advisable to reverse her head before starting out in the spring?

659. State the effects and conditions in a case of the above kind?

660. What would you do before letting go a patent anchor to make sure of its starting?

661. How would you take the crew from a disabled vessel in a heavy sea?

662. Your quadrant gets broken, what would you do?

663. If a vessel steams N x E for 100 statute miles, how far would she be at the end of her course from the meridian she started from?

664. Supposing she steered 100 nautical miles instead of statute miles, how far would she be from the meridian she started from in nautical miles?

665. In your judgment do you think that lake steamers should be compelled to carry as part of their equipment, a properly constructed drag or sea anchor with sufficient area to hold the largest vessels into the wind during storms?

ANSWERS TO QUESTIONS FOR WHEELSMEN AND WATCHMEN.

TWENTY-FIRST INSTALLMENT. PUBLISHED OCT. 31.

236. Any line forward of an athwartship line on board is forward of the beam; any bearing less than eight points from the course.

237. Properly speaking, a ship's beam is her greatest width.

238. No. Abeam means at right angles with the keel; as the light bore abeam. The beam and abeam are often used the same, as the wind forward of the beam or forward of abeam. Forward of abeam is the more proper.

239. In the direction of abeam, crosswise.

240. Yes.

241. The center of the ship, along a fore-and-aft line; over the keel line. Also the middle portion of a ship, as the amidships section of the hull.

242. A fore-and-aft line drawn directly over the keel.

243. A fore-and-aft line may be drawn parallel with the keel line of the vessel, but an amidships-fore-and-aft line is a line directly over the keel, that is, coinciding with the keel. The stem, masts, smokestack, etc., are in the amidships-fore-and-aft line.

244. In the center of the ship.

245. No difference.

246. From SSE to WNW by way of north.

247. From SW to NNW by way of west.

QUESTIONS FOR WHEELSMEN AND WATCHMEN.

TWENTY-THIRD INSTALLMENT.

258. You are steering NNE and an object bears 2 points forward of abeam, what is the bearing by compass?

259. How do you lay a course on a chart?

260. How do you find the direction of any line drawn on the chart?

261. What is a true course on the chart?

262. What is a meridian?

263. Where is the greatest amount of friction and wear on the steering cables?

264. What can you do to reduce this friction and wear?

265. What is a sheet or common bend?

266. What is a reef knot?

267. What is variation of the compass?

268. Where do you find the variation of the compass?

269. How do you allow for it?

270. How much and which way is the variation at Duluth?

271. How would you find the true direction of Duluth piers?

272. If you did not know and you wanted to find out what kind of a light on Duluth piers and on which pier, how would you find out?

THE LAYING UP OF COMPASSES.

When boats are placed in winter quarters it is recommended that the pilothouse or steering compass be left in its place, but thoroughly covered with old bedding or otherwise, to protect it from the cold; and the colder the place laid up at the more particularly this should be attended to. Where the upper or bridge binnacle cannot be removed, or any other binnacle whose position exposes it to the cold, its compass should be taken out of its gimbal ring and stowed away where it will be least sensible to any magnetic disturbance, either from changes in the ship's magnetism or from outside influences, alongside, etc. This compass should likewise be thoroughly covered to protect it from the cold. When stowing a compass away on board be careful not to place it close to a steel bulkhead, and also away from the steel deck— as far from iron on all sides as possible. Probably as good a place as any is in the master's room on a wooden table placed in the center of the room. Two compasses should never be placed close together for any length of time, especially in the case of storage. A compass should be laid up in a place as free from magnetic disturbance as is possible, and care should be taken not to have it come within the influence of such strong disturbances as an electric lighting plant, trolley wires and currents, electric working apparatus, etc. Properly, all compasses should be taken off the boat, and laid up ashore, and no two compasses should be placed within 15 ft. of each other, and the farther away the better. Where compasses are left on board for the winter and subjected to the ship's magnetism and its changes, and also to magnetic influences outside of the hull, they should have free gimbal action, thus affording the compass needle to move freely and respond to the changes that usually take place in a ship's magnetism by induction, and also to any disturbing effect that may take place on the outside of the ship. All bodies having magnetism have the power of making other bodies magnetic that are capable of receiving magnetism. The process is that of induction and not only takes place under very peculiar circumstances, but under varied conditions as well. A stronger magnetic body is not only capable of decreasing the magnetism of another body having a less intensity but is likewise capable of reversing its poles. Many times it simply changes the position of its poles, thus weakening the original magnetism. It may also increase the amount of the original magnetism if the magnetism of the inducing force is in the same line with opposite poles to each other. As a rule the magnetism acquired by induction is lost in time, and a short time at that, after the receiving body is removed from the inducing effect, and especially when the body induced has been reversed. The earth being a magnet it also has this inductive property and is not only capable of making magnetism in other bodies but to change it as well. The earth's inductive force is in the same line with the magnetic meridian of any place, being also one of the forces that gives action to every compass needle. An example will better illustrate this: Supposing the case of a steel hull built with her head north magnetic, the bow end would then have north and the stern end south magnetism. The hull acquired its magnetism from the earth's inductive force, that is, simply by the earth's magnetism passing through the hull. Now, imagine this hull laid up for the winter heading south, and you will at once see that the earth's magnetism is in direct opposition to that of the hull, the earth's north polarity comes in contact with the ship's south polarity. After the hull has laid in this same direction for a long

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time the earth's magnetism passing through the hull incessantly has the effect of changing the magnetism of the hull to its own direction; that is, north polarity toward the north and south polarity toward the south. The longer the hull remains in this position the weaker its magnetism becomes, because the earth's magnetism is continually antagonizing it and as a consequence, gradually overcomes it. If the hull were left long enough it could have the further effect of actually reversing the poles of its magnetism, that is, the north pole would now be at the stern and the south pole at the bow. Now, imagine an ore pile or an electric power house close to the hull, and say its (the power house) magnetism is exerted in some other direction than that of either the ship's magnetism or that of the earth. The stronger of these forces will take precedence. If the disturbing force on shore is stronger than the earth's force, or the ship's force, which would be very likely the case, the hull's magnetism will change to coincide with it. The action of these two forces will, of course, complicate the direction of the changed magnetism. Many times the effect is to produce what is known as consequent poles in the ship's magnetism, and that is poles lying near to the regular poles. When the inductive force makes an angle with the direction of the ship's magnetism the effect is to weaken the original magnetism and to start another line of magnetism in the hull where it comes in contact with the hull, and its opposite pole will be where it leaves the hull.

As already stated, induced magnetism is gradually, if not quickly, lost as soon as the ship gets away from the inducing force, and the effect then is the restoration of the ship's original magnetism, or that to which the hull had settled or would settle were it not disturbed by any other force than that of the earth's magnetism, such as the ordinary conditions of a vessel in commission—moving about enough so that the earth's inductive force has no chance of striking the hull at one and the same point for any long length of time.

It is both the earth's inductive force and such disturbances as mentioned on shore, that is responsible for compasses being so much different in the spring than they were the fall before, and also, for the same reason that the compass gradually comes back to its old courses —the induced magnetism is leaving the hull and the original magnetism is again acting on the compass. Now, when the compass is left on board for the winter it too comes under these inducing effects, which may either increase or decrease the pointing power of the compass needles. The change may only be a slight one, but the effect a very large one, for it takes but very little to throw a compass out. A compass stored ashore would not be subjected to these influences, and as the magnetism acquired by lying in one direction for a long time is only transient, and is lost both by getting away from the inducing force and also by reversing the hull at its mooring slip, it is recommended that before starting out in the spring that every ship have her head changed to the reverse direction in which she lay during the winter, and that this be done some time before the compasses are brought on board. This would further insure that the compasses would not be subject to the usual changes in the ship's magnetism that take place during the winter. Not only this, the transient induced magnetism acquired by lying in the one direction would be reduced to the minimum, and that before the vessel ever started out in the spring. Very little change would take place in the ship's magnetism after she got started in the spring if these recommendations were carried out. Not only this masters would find that their compasses worked much better and could be relied upon, whereas, as now, little or no dependence can be placed in them. There is also the further advantage of not having to wait a couple of months for this magnetism to be lost. Adjusting the compass in the spring does not improve it in the least, because the compass is adjusted for the then present conditions of the ship's magnetism. Neither will the adjustment have any effect of stopping the loss by induction or in counteracting the effects. The expense of carrying out the above recommendations would be very small, and insignificant compared with the resulting value.

It is further recommended that every boat be slowly swung both on a port and a starboard helm at the beginning of the first trip in the spring. This is especially recommended where boats have been bunched during the winter and no chance of reversing them in the spring. It should be done anyway, even where a vessel has been reversed before starting out, as too much attention and precaution cannot be given and taken in all matters connected with a ship's compass.

It is further recommended that boats unloaded under electric working hoists, or similar conditions, that they be swung slowly on a port and starboard helm as soon as they get outside where there is room or before the vessel is put on her course. The loss of time will only be a few minutes, which, in many cases will be saved at the end of the course in being able to fetch right. It often occurs in the spring of the year that boats have to wait a week or so before getting started, owing to ice conditions, etc. When it can be done (and even if you have to go to some trouble in doing so) lay your boat at a dock or elsewhere, so that her head will lie in a reversed direction from that in which it lay during the winter. If you cannot get a dock that runs exactly with what is required, get one as near to reverse as possible. Where the boat can be reversed at her own winter moorings, all the better. There is more advantage to this than many may realize and to those masters who take but very little stock in such matters, the writer wishes to inform them that no harm whatever, even if no good, can result in the practice of any of the foregoing recommendations. There is a great deal more that can be said about this matter but I will leave it till another time.—LONG.

AMONG OUR NAUTICAL VISITORS.

Capt. John Tower, of the steamer Frank T. Heffelfinger, was in Cleveland on Tuesday while his craft was discharging her ore cargo at Lorain. The MARINE REVIEW acknowledges a pleasant call from the genial skipper. Capt. Tower is a thorough sailor, both in the square-rigger and in steam, having sailed to all parts of the world. There are few men who hold a master's license for all the known waters of the world, including our fresh water seas, but this is what Capt. Tower possesses. Capt. Tower sailed one of the Counselman steamers from Chicago across the pond to Liverpool and up the North sea to Antwerp. After returning to the Atlantic coast his steamer engaged in the oil trade and the captain did most of the piloting in and out of the ports sailed to along that coast. In speaking of the ill-fated Cyprus, Capt. Tower incidentally mentioned that he was in company with her coming down the lake but got a long ways ahead between Keweenaw Pt. and Whitefish. Capt. Tower says that a very heavy sea was running and at times his boat did some wicked rolling, and had it not been for the way his ore was stowed he is sure it would have shifted. He said that the newspaper accounts that there was not much wind and sea it not true; the storm did not cover much area and was a slow-moving one, for they seemed to remain in about the center of it all the way across the lake. The storm was a heavy one and because it did not cover much territory is the reason that other near-by places did not experience the full force of it. Capt. Tower says that he has noticed sev-

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eral times now that there is always more sea in the vicinity of where the Cyprus was lost than at any other place on the route with the same conditions, and he thinks that it may possibly be due to some peculiarity of the bottom, such as a ridge or wall of rock rising therefrom, notwithstanding the fact that there is no wave effect at certain depths below the surface. What there may be in this theory could only be told after a lengthy scientific investigation.

Capt. John M. Fields, the expert compass adjuster, was among our marine visitors on Saturday, having come in off the lake. Capt. Fields has had an exceptionally good season of it, the best since he came to the lakes from the Pacific coast. He was on eighty-nine different boats so far this season and has four more new ones to "fix up." So busy was Capt. Fields that it was necessary for him to have a power launch and a man to operate it so that he could get from one boat to another without losing time, this plan being cheaper and more satisfactory than traveling by rail. Capt. Fields would meet a steamer in his launch in the rivers, and he and his man taken on board and also the launch. The outfit would stay with the ship till a favorable time came for adjusting the compass, after which they were set afloat and picked up by another, and so on. For eight straight days the launch was carried back and forth between Port Huron and Detour. On another occasion the launch was taken as far as Whitefish Pt. This is certainly a novel method of covering the necessary territory and meeting the boats advantageously, little time being lost in either waiting or in missing them. Capt. Fields expects to conduct the several navigation schools for the Pittsburg Steamship Co. again this winter. These free schools are a source of much valuable and beneficial information, and the Pittsburg Steamship Co. is to be highly commended for its generosity and the interest taken in its men. The thanks are due to its president and general manager, H. Coulby. This is simply a case of sound judgment and farsightedness on his part, from which other steamship owners and managers might learn a valuable and profitable lesson by imitating. For the answer the MARINE REVIEW takes the following pertinent saying from a lake master in the harness: "This is an age of progress and improvement in all lines, we must all realize this, so that anything that increases a man's confidence in himself and his work increases his efficiency. He is not only worth more to himself but to his employer." Let the good work go on.

OUR COURSE AND BEARING CORRECTOR.

The MARINE REVIEW desires to announce that its Course and Bearing Corrector or Indicator is now ready for marketing, and that all orders for same will receive prompt attention. The Corrector is the very best device of its kind on the market and every seaman will find it to his advantage to have one of these instruments.

The Corrector consists of three pieces of thick cardboard, two circular and one square; the graduation on each being nicely printed from accurate plates; the cards are placed one on top of the other—the upper one being printed in green, 5 in. in diameter; the middle one in red, 8 in. in diameter; and the lower black, 11 in. in diameter, or on a cardboard 14 in. square. The lower card is the stationary card and the other two revolve from its center, and can be moved independently of each other. The three cards are printed on a white background, and the stationary or black compass represents true courses and bearings, the red card is the variation compass and from it correct magnetic courses and bearings are read; the green card represents the deviation compass and from it compass courses and bearings are read. A radial arm of celluloid revolves from the same center as the cards and its radius is long enough to sweep the three cards. The compass cards and radial arm can be set to any desired course and independently of one another.

The device is for working and proving all compass problems mechanically and a picture of the example itself. Its use affords the only method that is capable of proving this portion of a navigator's work. The device is as necessary and as useful to the navigator as it is to the beginner, and one can learn more about variation and deviation, the correcting of courses and bearings, and the naming of the variation and deviation, than by all the other methods put together, and in one-quarter of the time. This instrument is to the navigator what the adding machine is to a commercial house. One cannot make a mistake because every detail of the problem is constantly before him in the form of a picture. To work the device simply turn the red and the green cards (variation and deviation compasses) so that their norths coincide with north on the black card (true compass); in other words, have all three norths in the same straight line. Next set the amount of your variation on the red card, by turning its north to the right of true north for Ely Var. by its amount in degrees or quarter points, and to the left for Wly Var. Next place the green card in the direction and by the amount of the deviation, its north to the right of north on red card for Ely and to the left of it for Wly; then any one of the three courses or bearings—the true, the correct magnetic, or the compass course—being given, revolve the radial arm until its straight edge is upon that course, when the other two are seen on the same edge. If it is the true course that is desired simply set the radial arm to that course on the outside compass, then the red card will show the correct magnetic course that corresponds to it and the green card the compass course corresponding therewith. If you have the compass course or bearing and want to turn it into its true course or bearing, simply set radial arm to that point on the green card and then read outward, either on the red or black card, depending whether you want its correct magnetic or its true course or bearing. This is simply one of the many uses the device can be put to. The compass cards are of the very latest pattern and are well defined, and the course can be read both in quarter points and degrees. No live navigator can afford to be without one of these cheap but useful devices, and especially for the beginner or one who is anxious to learn all about variation and deviation and the conversion of courses. It will also be found very helpful for one learning the compass for all the points have their names inscribed on them, instead of only the cardinal and intercardinal points, as on the ordinary compass. The Corrector is especially recommended for nautical school work and every student should have one of them. In the next issue of the MARINE REVIEW the Corrector will be more fully explained and with illustrated examples. The price of the Corrector is $1.50. Send in your order at once.

The Servia, a bark rigged vessel engaged in the salmon trade, was wrecked on Nov. 6 off Julia Point, Carluk Harbor. The Servia was owned by the Charles Nelson Lumber Co. of San Francisco.

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THE THEORY AND PRACTICE OF LAKE NAVIGATION

BY CLARENCE E. LONG

OFF-SHORE DISTANCE FINDING.

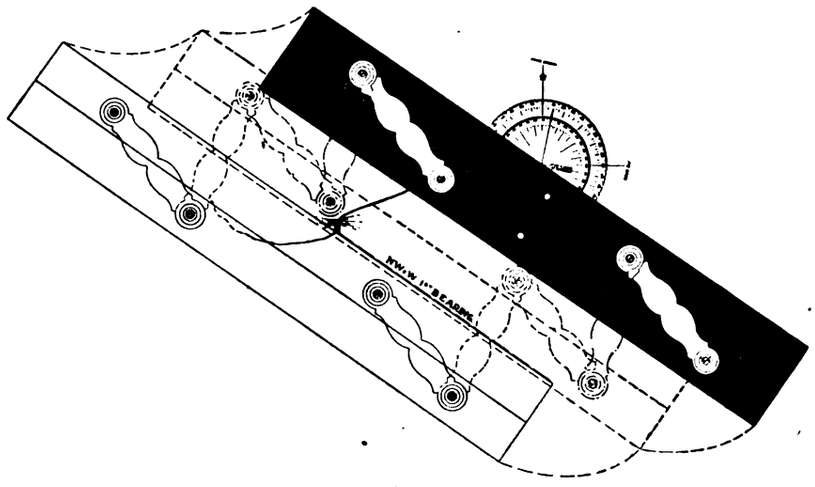

FIG. 1.

The following method of two bearings of the same object for ascertaining a ship's position at the time of the second bearing, is not only an accurate one but a very convenient one as well. Take the bearing by compass of an object, say A; turn it into its true bearing by allowing the deviation according to the correct magnetic course being steered and using that variation found on the chart for the ship's locality. Draw this converted bearing line on the chart through the object used for the bearing; it is needless to say that the ship will be somewhere on that line of bearing, but how far is the purpose of the method to determine. Next, after the ship has run a sufficient distance to make a good, broad angle, take another compass bearing of A, turn it into its true bearing and draw another line from A on that bearing; the ship is now some place on this line. Now, convert the compass course steered into its equivalent true course; put the distance run between bearings—on your dividers, lay your parallel rulers on the chart compass according to the true course steered, and then move them backwards or forward over the lines of bearings drawn till the distance on your dividers measures the distance between the two bearings along the edge of the rulers, and draw a line; where the line representing the course intersects with the line drawn to represent the second bearing, is the place of the ship at second bearing, and where the course intersected with the first bearing was the place of the ship at first bearing. Measure the distance from the ship's position to the object on shore along the second line of bearing, and you have it. The same thing may be done with the first bearing if found necessary for any purpose.

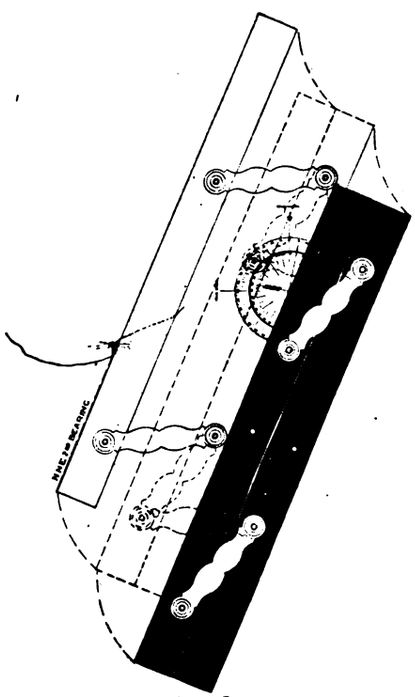

FIG. 2.

An example, graphically illustrated, will explain just what is meant: Compass course W ¼ S, Dev. 1-pt. Wly., Var. ¼-pt. Ely., steaming 12 miles an hour, at 9 a. m., a lighthouse bore NW ¼ W by compass and at 9:35 a. m. the same object bore NNE ¾ E. Required ship's position on the chart and the distance and true direction from the object at second bearing; also the same thing at first bearing.

The first thing to do is to find the total correction of the compass, that is, the Var. and Dev. combined. The deviation you will find from ship's deviation table and the variation from the chart according to the locality. In the above example the total correction is ¾-pt. Wly., the Dev. being 1-pt. Wly. and the Var. ¼-pt. Ely.; hence, the true course being steered is ¾-pt. to the left of the compass course, and ¾-pt. to the left of W ¼ S is W x S. The same thing is true of the compass bearings, ¾-pt. to the left of each bearing gives the true bearing; or worked out in full it would stand as shown on accompanying page.

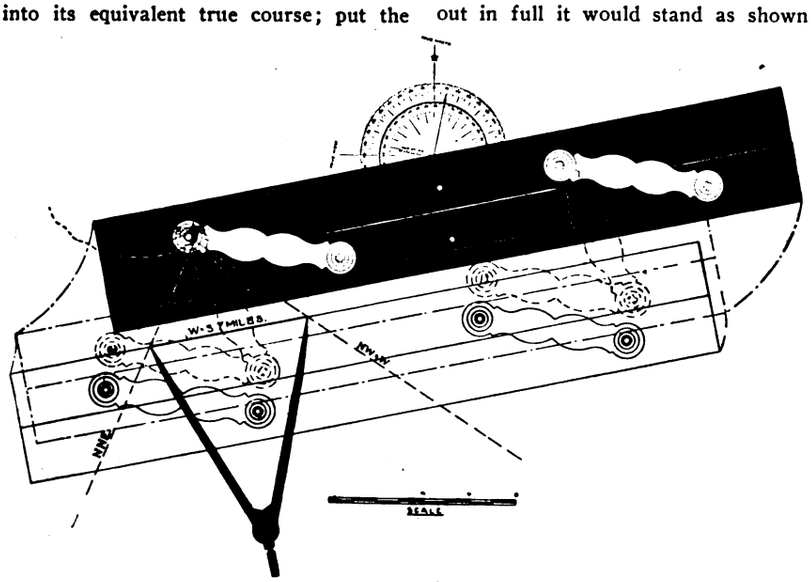

FIG. 3.

FIRST OPERATION.

Operation necessary in the first case—lay parallel ruler on chart compass so that it coincides with NW x W and SE x E and then work the ruler down over the lighthouse in question and when directly over it draw a pencil line, drawing it much longer than is required.

SECOND OPERATION.

Lay parallel ruler on chart compass so that it coincides with NNE and SSW and

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then work it down, keeping it perfectly parallel, till its edge lies directly over the lighthouse indicated on the chart, and draw a pencil line as before. You now have the two converted compass bearing lines drawn on the chart just as they were actually taken.

THIRD OPERATION.

Lay parallel rulers on chart compass corresponding to the true course of W x S and work the ruler down over the bearing lines drawn and where the span of the dividers touches each bearing line at the same time is the actual course the ship has made on the chart, and which also shows the position of the ship at the time the bearings were taken.

The distance ran between bearings in the above example was 7 miles, it taking 35 minutes at 12 miles an hour to cover the distance between the times of the two bearings.

This bearing is sometimes called a scalene triangle bearing, because its shape is always that of the scalene triangle, and that is, a triangle whose sides and angles are all unequal.

SHOWING THE BEARING COMPLETED.

The simplest way of finding a ship's position by means of compass bearings is by doubling the bow angle, because in that case the run is the distance from the object at the time of taking the second bearing. This latter method simply gives you the distance you are from the object, but not its true bearing, so that if this be required the second bearing by compass must be turned into its true bearing and the line drawn on the chart accordingly. For example, the compass course is west, first bearing is WNW (3 points from course) and second bearing is NW x N, or six points from course. The ship between the times of taking the two bearings has run 6 miles, consequently the ship is 6 miles from the object, whose compass bearing is NW x N. Now, if the compass has both variation and deviation, the bearing line NW x N could not be put on the chart as a true bearing, it would first need conversion. A handy way of doing this is to simply convert the second bearing into its true bearing by applying the variation and deviation to the compass bearing; then to draw this line on the chart over the object and measure off the distance as found by running between the two bearings. Where it is unnecessary to lay off the ship's exact position on the chart the variation and deviation do not enter the problem, the compass being simply used to measure the angles by and from which the distance is determined by knowing the distance run and the angles between it. But where it is necessary to get the ship's true position on the chart the variation and deviation must first be allowed to the compass bearings. Many books and writers do not make this point strong enough, and by reason of it there are many who seem to have an idea that no allowance is to be made.

Compass Course	W ¼ S = 7¼	pts. R. of S.
Deviation Wly.	1	pts. L.
Correct Magnetic Course	6¼	pts. R. of S.
Variation Ely.	¼	pts. R.
True Bearing	7	pts. R. of S. = W x S.

	First Bearing.	Second Bearing.
Compass Bearing	NW ¼ W	NNE ¼ E
Deviation Wly.	1-pt.	1-pt.
Correct Magnetic Bearing	NW x W ¼ W	N x E ¼ E
Variation Ely.	¼-pt.	¼-pt.
True Bearing	NW x W	NNE

HIGH LEVEL BRIDGES IN CLEVELAND.

(Continued from page 21.)

ance that a three per cent. or even less, grade could safely be figured on.

Mr. Goulder said that on the modern freighter the smokestack is usually 77 ft. above the keel, that the most reliable lights a steamer is guided by are the range lights, and to get a range there must be after lights. The forward light is by law carried 40 ft. above the spar deck and the after light 15 ft. above the forward light.

Harry Coulby called attention to the fact that the forward spar would actually be higher than the after spar when the boat was in a light condition. He did not think it possible to lower the spars any as the forward spar does not reach much above the top of the pilot house now.

The suggestion of telescopic spars was discussed, but was not favored by vessel owners. W. J. Springborn, director of public works, was rather impressed with the idea of a telescopic spar, holding that the lights were not needed while the vessel was in harbor. He thought the quickest way to solve the whole problem was to lower the masts and even suggested that the city would pay vessel owners a certain sum per annum for the labor of raising and lowering them while passing under the viaducts.

Mr. Goulder said that the vessel owners had first of all considered that 110 ft. clearance was needful, but had amended it to 100 ft. He now thought that if 92 or 93 ft. clearance could be secured that vessel owners would be content with a fixed structure and would bear any expense necessary to accommodate the spars of their vessels to it.

In answer to a direct question Mr. Springborn said that he understood that the Erie and Nickel Plate railways intended to eliminate the center piers on the bridges that they are now replacing, and that the administration is pledged to the removal of every center pier from the river, not alone for the interests of navigation but for general protection to the flats in time of freshets. He also stated in answer to a question that he was perfectly willing to issue an order placing the operation of bridges under the direction of the harbormaster. Mr. Goulder thought that the harbormaster should have direct charge of the movement of ships and the operation of bridges.

Mr. Coulby thought 92 ft. to be the least clearance that vesselmen could get along with. He was also of opinion that a four per cent grade was utterly impracticable and that if the viaduct was constructed with a four per cent grade across the river a dozen teams would be found with broken legs at the bottom of the grade every morning. He did not think that for many years any of the ships over 28 ft. molded depth would go above the viaduct.

Regarding the passenger lines T. F. Newman, general manager of the Cleveland & Buffalo line, stated that he thought they could get down to 90 ft. readily.

The committee adopted a resolution, proposed by Capt. John Mitchell and seconded by Mr. Coulby, recommending that the fixed structures across the river have a clearance of not less than 93 ft.

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BIDS FOR NAVAL SUPPLIES.

Bids received at the bureau of supplies, navy department, Washington, D. C., under a special call and opening, opened Nov. 7, included the following:

Class 31—Pensacola—Brass Globe and Angle Valves.

American Supply Co., Mobile, Ala...$ 829.80
Buckeye Iron & Brass Works, Dayton, O. ... 833.52
Central Metal & Supply Co., 609 E. Lombard St., Baltimore, Md. ... 748.80
Cuyler & Mohler, 611 William St., Baltimore, Md. ... 747.72
Fairbanks Co., New Orleans, La. ... 957.12
Hartman Co., 1231 N. Front St., Philadelphia, Pa. ... 753.96
Handlan-Buck Mfg. Co., St. Louis, Mo. ... 753.96
Knox & Bro., 96 John St., New York 754.04
E. F. Keating Co., 452 Water St., New York ... 760.68
Lunkenheimer Co., Cincinnati, O. ... 815.04
Manhattan Supply Co., 127 Franklin St., New York ... 693.48
Manning, Maxwell & Moore, 85 Liberty St., New York ... 771.87
Motley, Green & Co., 66 Broad St., New York ... 732.12
Nelson Valve Co., Windmoor, Pa... 664.80
William Powell Co., Cincinnati, O.. 801.48
Charles E. Robidoux, St. Louis, Mo.. 1,047.72

Class 32—Pensacola—Brass Tees, Elbows, Unions, Bushings and Plugs.

American Supply Co., Mobile, Ala....$470.28
Crane Co., 519 So. Canal St., Chicago, Ill. ... 404.80
Central Metal & Supply Co., 609 E. Lombard St., Baltimore, Md. ... 473.90
E. F. Keating Co., 452 Water St., New York ... 933.47
Manhattan Supply Co., 127 Franklin St., New York ...$418.09 723.03
A. B. Sands & Sons Co., 22 Vesey St., New York ... 449.88

Class 75—Brooklyn—20 Binnacles.

Keuffel & Esser, Hoboken, N. J.....$2,900
E. S. Ritchie & Sons, Brookline, Mass.. 3,038

Class 76—Brooklyn—30 Peloruses.

Keuffel & Esser, Hoboken, N. J.....$3,240
E. S. Ritchie & Sons, Brookline, Mass.. 2,970

Class 91—Norfolk—3,800 ft. Tiller Rope and Hoisting Rope.

Berry & Aikens, Thirty-sixth and Wharton Sts., Philadelphia, Pa....$ 879.34
Manhattan Supply Co., 127 Franklin St., New York ... 783.82
New Jersey Foundry & Machine Co., 9 Murray St., New York... 769.20
Vermilye & Power, 17 Battery Place, New York ... 720.00
Fairbanks Co., Baltimore, Md. ... 1,234.00
I. M. Umstadter, Norfolk, Va. ... 828.00

Class 92—Norfolk—14 Duplex Chain Blocks.

F. S. Banks & Co., 73 Warren St., New York ...$317.46
William W. Clark & Son, 546 Monument St., Baltimore, Md. ... 408.00
Trevert Machinery Co., 18 Dey St., New York ... 336.00
Handlan-Buck Mfg. Co., St. Louis, Mo. 408.00
Knox & Bro., 96 John St., New York. 408.00
J. B. Kendall, Washington, D. C. ... 336.90
Manhattan Supply Co., 127 Franklin St., New York ... 362.52
Manning, Maxwell & Moore, 85 Liberty St., New York ... 408.00
Motley, Green & Co., 66 Broad St., New York ... 408.00
Montgomery & Co., 107 Fulton St., New York ... 408.00
New Jersey Foundry & Machine Co., 9 Murray St., New York... 319.80
Sherman-Brown-Clements Co., 78 Murray St., New York ... 404.50
Vermilye & Power, 17 Battery Pl., New York ... 324.40
Fairbanks Co., Baltimore, Md. ... 408.00
J. B. Roache, 350 Fulton St., Brooklyn, N. Y. ...$366.56 408.00

Class 101—Norfolk—Four Sets Diving Apparatus.

Andrew J. Morse & Son, 221 High St., Boston, Mass ...$4,388
A. Schrader's Sons, 32 Rose St., New York ... 4,420

Class 102—League Island—Two Sets Diving Apparatus.

Andrew J. Morse & Son, 221 High St., Boston, Mass. ...$2,194
A. Schrader's Sons, 32 Rose St., New York ... 2,202

Class 111—Portsmouth—425 lbs. Square Packing.

Brooklyn Forge & Supply Co., Brooklyn, N. Y. ...$501.50
Crandall Packing Co., 136 Liberty St., New York ... 531.25
Double Service Packing Co., 430 Walnut St., Philadelphia, Pa. ... 371.87
Garlock Packing Co., 136 Liberty St., New York ... 562.27
Hart Packing Co., 145 High St., Boston, Mass. ... 510.00
J. B. Roache, 350 Fulton St., Brooklyn, N. Y. ... 956.25

Class 147—Portsmouth—252 Valves.

Central Metal & Supply Co., 609 E. Lombard St., Baltimore, Md. ...$669.60
Cuyler & Mohler, 611 William St., Baltimore, Md. ... 367.92
E. F. Keating Co., 452 Water St., New York ... 385.56
Lunkenheimer Co., Cincinnati, O. ... 446.04
Charels E. Robidoux, St. Louis, Mo., (part) ... 354.00
Brauman-Dow Co., 239 Causeway St., Boston, Mass. ... 469.80

Class 155—Portsmouth—6 Sq. Yds. Gasket Gum.

S. R. Fletcher & Co., 26 Cortlandt St., New York ...$378.00
Gutta Percha & Rubber Mfg. Co., 126 Duane St., New York ... 204.00
Mallison & Grossman, 23 Warren St., New York ... 371.40
Diamond Rubber Co., 1846 Broadway, New York ... 328.98
E. F. Goodrich Co., 66 Reade St., New York ... 414.00
H. W. Johns-Manville Co., 100 William St., New York ... 482.40

Class 156—Portsmouth—139 Sq. Yds. Asbestos Packing.

O. A. Danzenbaker, Washington, D. C.$661.20
Double Service Packing Co., 430 Walnut St., Philadelphia, Pa. ... 670.98
Ehret Magnesia Mfg. Co., Land Title Bldg., Philadelphia, Pa. ... 716.30
E. F. Keating Co., 452 Water St., Philadelphia, Pa. ... 710.30
Manhattan Supply Co., 127 Franklin St., New York ... 733.20
New Jersey Asbestos Co., 52 Dey St., New York ... 1,027.75
Rider & Cotton, Portsmouth, N. H.... 674.70
H. W. Johns-Manville Co., 100 William St., New York ... 993.00

Class 161—Norfolk—Twelve Motor Dories.

Atlantic Co., Amesbury, Mass. ...$6,108
American Supply Co., Mobile, Ala. ... 5,880
Electric Launch Co., Bayonne, N. J.... 6,240
Motley, Green & Co., 66 Broad St., New York ... 4,800
Topham Boat Mfg. Co., Boston, Mass... 7,650
Vermilye & Power, 17 Battery Pl., New York ... 4,908
Gas Engine & Power Co. & Chas. L. Seabury, Morris Heights, N. Y. ... 7,176
Lumley-Dodson Co., Norfolk, Va. ... 5,400

CANAL CIRCULAR 397.

Bids received by the general purchasing officer of the Isthmian Canal Commission, for material and supplies, opened Nov. 8, included the following:

Class 1—Four Boiler Feed Pumps.

A. S. Cameron Steam Pump Works, foot of E. Twenty-third St. and East River, New York ...$324.00
M. T. Davidson Co., 154 Nassau St., New York ... 550.00
Fox Bros. & Co., 126 Lafayette St., New York ...$230.80 259.80
Gardner Governor Co., Quincy, Ill.... 212.00
A. D. Granger Co., 90 West St., New York ... 296.00
Manning, Maxwell & Moore, 85 Liberty St., New York ... 211.52
Motley, Green & Co., 66 Broad St., New York ... 236.00
National Electric Supply Co., Washington, D. C. ...$231.00 407.40
Queen City Supply Co., Cincinnati, O.. 252.00
Reliance Machine & Tool Works, St. Louis, Mo. ... 276.00
Charles E. Robidoux, 1012 Chemical Bldg., St. Louis, Mo. ... 252.00
Henry R. Worthington, 114 Liberty St., New York.....$204.76, $224.44, $538.20 ... 989.76
F. S. Banks & Co., 73 Warren St., New York ...$225.00 410.00
Drew Machinery Agency, Manchester, N. H. ... 256.00

Class 2—Six Row Boats.

James Burcher, 852 Swanson St., Philadelphia, Pa. ...$ 974.00
Duplex Roller Bushing Co., Belfast, Me. ... 720.00
Fox Bros. & Co., 126 Lafayette St., New York ... 972.00
Gas Engine & Power Co. and Charles L. Seabury Co., Morris Heights, N. J. ... 2,250.00
David Kahnweiler's Sons, 2 Dover St., New York ... 1,500.00
Motley, Green & Co., 66 Broad St., New York ... 870.00
F. S. Banks & Co., 73 Warren St., New York ... 978.00

Class 3—Six Whale Boats.

Duplex Roller Bushing Co., Belfast, Me. ...$4,800.00
Fox Bros. Co., 126 Lafayette St., New York ... 3,210.00
Gas Engine & Power Co. and Charles L. Seabury Co., Morris Heights, N. J. ... 8,214.00
David Kahnweiler's Sons, 2 Dover St., New York ... 4,050.00
Motley, Green & Co., 66 Broad St., New York ... 3,555.00

CANAL CIRCULAR 398.

Bids received at the office of the general purchasing officer of the Isthmian Canal Commission for material and supplies, opened Nov. 12, included the following:

Class 9—41 Hoisting Chains.

F. S. Banks & Co., 73 Warren St., New York ...$3,146.00
Bigelow & Dowse Co., 229 Franklin St., Boston, Mass. ... 3,237.00
Columbus Chain Co., Columbus, O... 2,518.60
Handlan-Buck Mfg. Co., St. Louis, Mo., per lb., $7.87, $8.10..... 8.48
Hayden-Corbett Chain Co., 250 Fulton St., New York ... 2,433.50
Lebanon Chain Works, Lebanon, Pa.. 2,953.10
Motley, Green & Co., 66 Broad St., New York ... 3,187.60
Newhall Chain Forge & Iron Co., 9 Murray St., New York..$2,694.10.. 3,130.00
Charles E. Robidoux, 1012 Chemical Bldg., St. Louis, Mo. ... 2,782.00
S. G. Taylor Chain Co., 96 Indiana St., Chicago, Ill. ... 2,851.00

Class 10—4,000 ft. Plow Steel Wire Cable.

Broderick & Bascom Rope Co., St. Louis, Mo. ...$ 960.00
Macomber-Whyte-Moon Co., 122 Center St., New York ... 1,448.00
John A. Roeblings Sons Co., 117 Liberty St., New York ... 1,413.60
U. S. Steel Products Export Co., 24 State St., New York..... 960.00

Class 11—5,700 ft. Unlined Linen Hose.

W. D. Allen Mfg. Co., 151 Lake St. Chicago, Ill. ...$ 739.05
Boston Woven Hose & Rubber Co., Cambridge, Mass. ... 787.50
James Boyd & Co., 14 North Fourth St., Philadelphia, Pa. ... 797.43
Combination Ladder Co., 32 Park Pl., New York ... 808.87
Fox Bros. & Co., 127 Lafayette St., New York ... 690.00
Handlan-Buck Mfg. Co., St. Louis, Mo. ... 844.00
S. F. Hayward & Co., 20 Warren St., New York ... 954.30
E. F. Keating Co., 452 Water St., New York ... 867.00
Manning, Maxwell & Moore, 85 Liberty St., New York ... 746.10
Mineralized Rubber Co., 18 Cliff St., New York ... 771.00
Motley, Green & Co., 66 Broad St., New York ... 772.20
Revere Rubber Co. of New York, 59 Reade St., New York ... 874.50
William G. Stevenson, 110 Race St., Philadelphia, Pa. ... 844.50
H. J. M. Howard, Washington, D. C. 1,116.00
United & Globe Rubber Mfg. Cos., Trenton, N. J. ... 948.00

The first test of briquettes as fuel by the navy department was made last week aboard the torpedo boat Biddle. One boiler burned briquettes and the other coal. It is stated that better steaming conditions were obtained than ordinarily and that a speed of 35 miles an hour was reached.

UNDERWRITERS SALVAGE SALE. S. S. "PICTON."

Pursuant to instructions received from the Underwriters, the undersigned will receive tenders for the purchase of the Steamer "Picton" damaged by fire, as she now lies at the Dock of the Richelieu and Ontario Navigation Company, Yonge St. Slip, Toronto, Ontario, up to 12 o'clock noon of Thursday, December 5th next, at his office, Corner Scott & Front Streets, Toronto. No tenders necessarily accepted. Tenders will be opened in the presence of the bidders at the time and place above mentioned. The Steamer can be inspected by intending purchasers on application to Mr. Edward Ramage, or to myself. W. G. A. Lambe, Lloyd's Agent, Corner Front & Scott Sts., Toronto.

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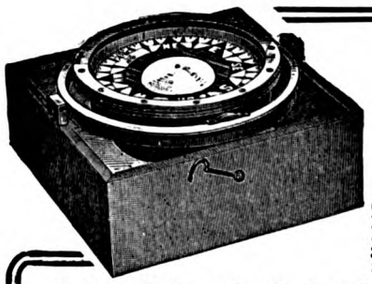

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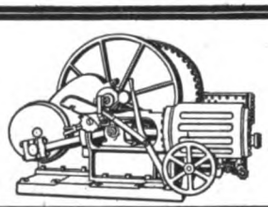
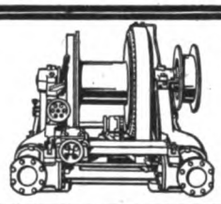
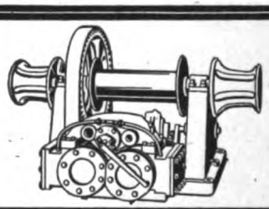

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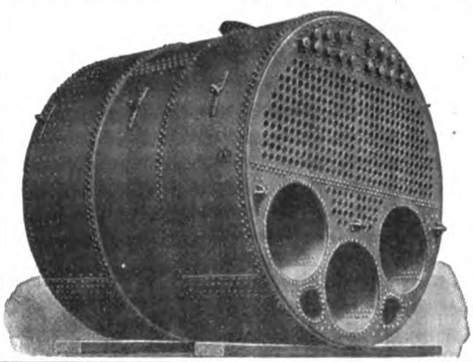

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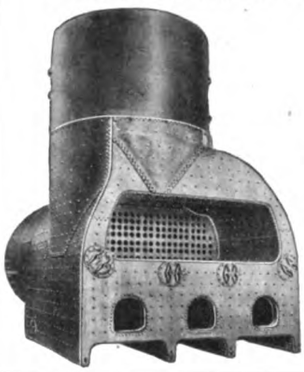

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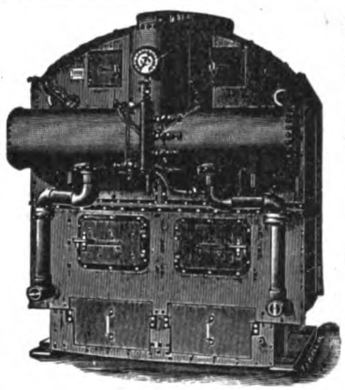

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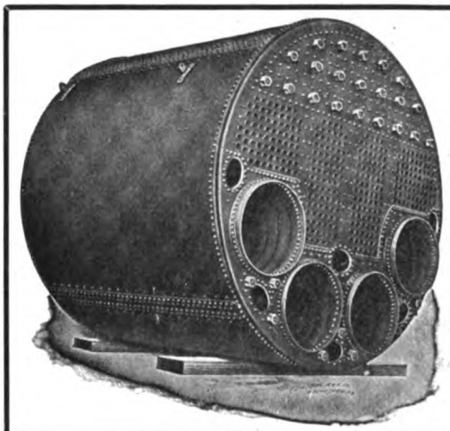

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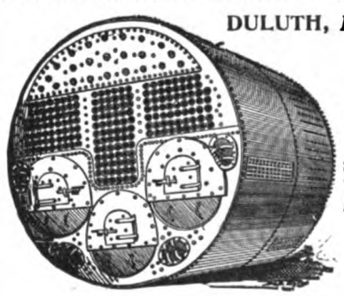

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